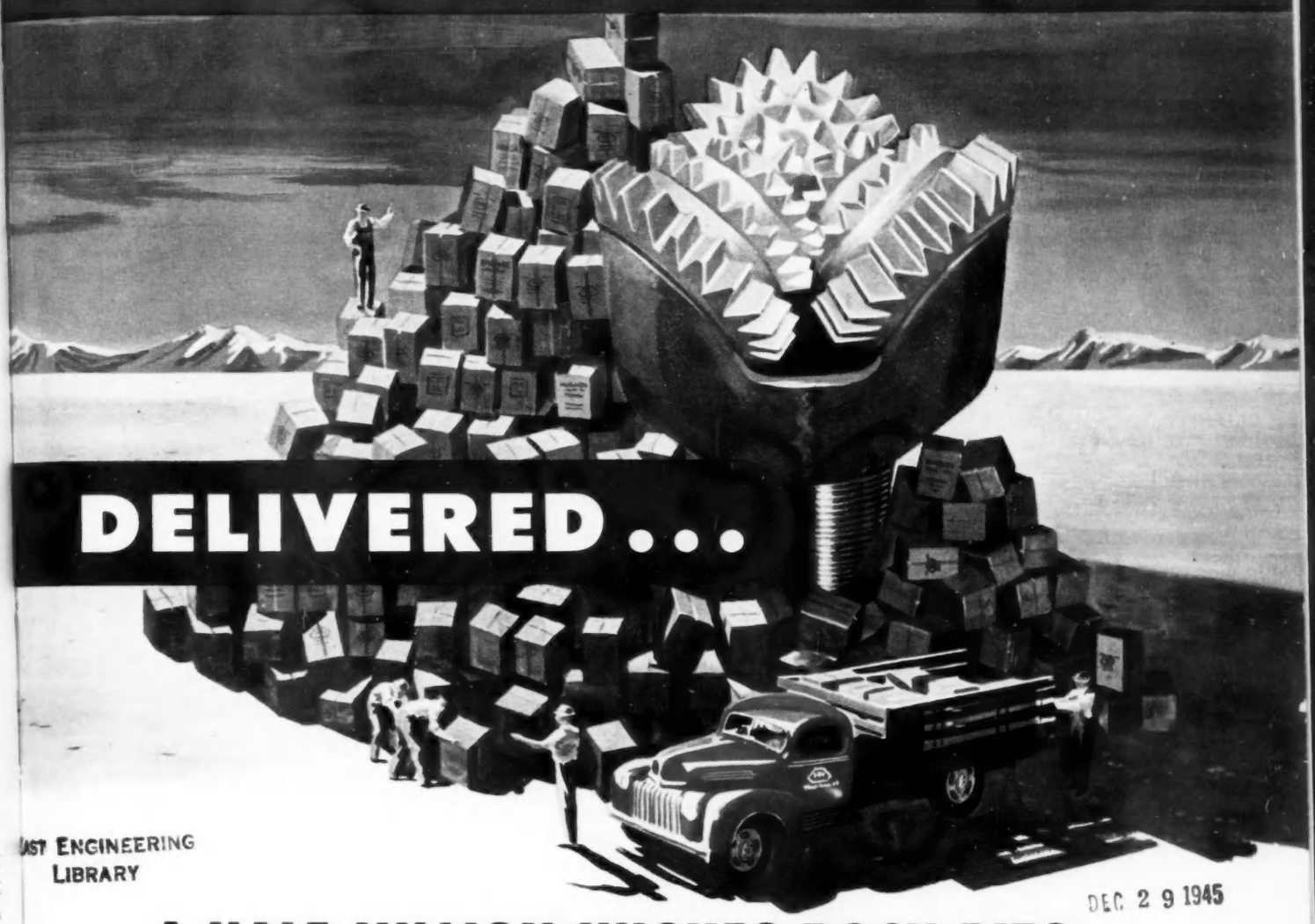
The OIL WEEKLY

FOR THE DRILLING, PRODUCING, PIPE LINE INDUSTRY



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for the refining-natural gasoline industry

LOOKING AHEAD
. . . with the Editor

DUE to the necessary changes in operation of the petroleum industry brought about by the war's end, there is great interest in the trend the industry will take during the next year or two. A number of interesting predictions have been made as to what may be expected, and some of the estimates cover a comparatively long range outlook.

The industry has experienced remarkable expansion during the past quarter of a century, climaxed by the biggest demand in history for petroleum and its products during the war years. Naturally, with the sudden decrease in demand, there has to be a cushioning period when the effects of the need for less oil will be leveled out.

All branches of the industry are affected, but the production phase is most likely to feel the greatest shock, inasmuch as the manufacturing of petroleum products is diversified.

Richard J. Gonzalez, economist for Humble Oil and Refining Company, holds a pre-eminent place among oil statisticians. His estimates are considered as well-founded and authoritative as can be made.

In a survey, "Trends in Petroleum Operations," soon to appear, he deals at length with basic trends governing the demand for crude in the United States. His paper indicates that in spite of the disturbances created by the war, the petroleum demands in this country in 1946 will be only moderately lower than the level indicated by projecting the growth trend of 5 percent annually that prevailed from 1936 to 1940.

The OIL WEEKLY

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The Outlook

A sharp fight is brewing over congressional approval of the $3.75 billion loan to England. Ratification itself is not believed to be in any danger, but members of Congress will use the debate to pry into the long-range program of the British labor government and the uses which will be made of the money. Scheduled to come up early in the 1946 session, the loan will be but one of a number of measures which will be beset by difficulties.

* * * *

Early 1946 legislation will include a measure to permit the Alien Property Custodian to restore to American companies and to foreign owners some 11,000 patents and copyrights belonging to nationals of Allied, enemy-occupied countries which were seized during the war as a protective measure against their disposal to the profit of the Nazis and to permit their use in the war program.

* * * *

Latest reports on the resignation of Secretary of the Interior Ickes have it that he is awaiting an opportunity to step down, but has been persuaded to stay until President Truman can get his house in order.

* * * *

Oilman Ed Pauley is in line for a cabinet post, but Truman doesn't want to put him in interior. Accordingly, Ickes will hold on until Forrestal quits, as he may do over the Army-Navy merger, whereupon Pauley will get the job as Secretary of the Navy, and Ickes will resign following ratification of the Anglo-American petroleum agreement. Ickes may be succeeded by D. Worth Clark, former isolationist senator from Idaho.

* * * *

The Allied powers succeeded so well in blasting German productive capacity that they will have to finance a program of German imports of fuel, raw materials for industry and food for the next two years. Most of the bombed plants can be quickly restored to a considerable percentage of their original productive capacity, but the isolation of Germany from the occupied areas which she dominated so long has cut her off almost completely from the materials to process.

* * * *

President Truman's experiment with fact-finding bodies to settle labor disputes is not faring so well, as was indicated by the failure of all but four of more than a dozen oil companies to send representatives to the hearings before the refinery panel and the insistence of organized labor that costs and prices must be considered. The crucial test, however, will come when the board makes its recommendations and it is put up to industry and labor to accept them. See page 29.

* * * *

The Army's Canol project and the Navy's development of the Alaskan petroleum reserve may have some point after all, it is indicated by the disclosure that American observers will accompany a Canadian Army exploration trip to the Arctic to study hemisphere defense against a polar attack in the next war.

* * * *

Stripper well operators in Oklahoma and Kansas plan a vigorous campaign to have Congress enact a permanent price differential on marginal oil to replace the present subsidy. Engineers who have studied the problem claim that half a billion barrels of oil will be lost forever unless the need of stripper well operators is recognized and they stay in business.

* * * *

Delayed maintenance of road surfaces on the 430,000 paved miles of the nation's highway system should alone require 6 million tons of petroleum asphalt in 1946.

* * * *

Indications are that the coming year will see many products lines built from important refineries to heavy consuming centers. Look for announcements on not one but several such lines.

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The Changing Panorama

The Philippines and Their Oil Policy

MANY Americans will be astonished to learn that in the Philippine Islands, if an American oil company desires to prospect for oil it must take into partnership the Philippine government, or Philippine Nationals, to the extent of control.

Shortly American taxpayers shall be expected to aid the Philippine Islands with heavy contributions of tax money. We shall be told, and truthfully, that Japanese occupation did such serious damage to the economy of the Philippines that only American help can restore that country to a semblance of its former prosperity.

The extent of American obligation remains to be determined. We presume that the Philippine government had previously expected that improvements made by the American taxpayers, through the United States government, would become the property of the Philippine government. Under what terms we are not sure.

But now we know that the help which is needed will run into additional millions—hundreds of millions. And we know that the expenditures will not be made to the Philippines as a part of the USA domain, because the Philippines are an independent nation, bound to us by firm ties of friendship and a common expenditure of sweat and blood. They are bound to us, too, by the ties of a boundless admiration for the devotion of a people to friendship and a sharing of ideals.

The cause of the people of the Philippines will stir American pulse as the cause of many other peoples cannot.

But, in view of this, is it not strange that the government of the Philippines does not profit from the experience of the American people with the American oil industry? Are not the terms under which their national resources may be developed in contradiction to the ties of friendship and evidences of common sense?

Where, may we ask, can the Philippine government expect the funds to become engaged in a private enterprise, such as the oil business? Where will their own nationals find within their resources funds with which to carry their part of the partnership imposed?

And what is the sense of it, anyway? There may be worth while deposits of petroleum in the Philippines. We do not know, and the Philippine government does not know. But there are possibilities. The conversion of such possibilities into fact, if it can be done, requires something which the oil industry has and which the Philippine people do not have at this time.

There is ample evidence at the command of the Philippine government showing that the most expensive manner for a government to develop its oil industry is to attempt to do it itself.

If a Philippine oil industry can be developed—and that is only a possibility, is it not desirable that it be done promptly and in such manner as to make it most complete and profitable to the Philippine people?

The answer to the foregoing questions can be nothing but "yes," and the American system of developing the oil industry points the way to how it can be done.

Socony-Vacuum Now "Up in the Air!"

WITH acquisition of its own fleet of planes placed at the disposal of its representatives throughout the country, the aviation department of Socony-Vacuum Oil Company has literally "taken to the air."

On the theory that it is just as incongruous for an aviation salesman to travel in anything except a plane as it would be for an automobile salesman to go about in a buggy, the company expects to expand its aviation activities and the number of aircraft in operation as the occasion demands.

This trend is one which will probably be followed by more oil companies, in various phases of their operations. Socony-Vacuum's planes are two to 14-place cabin models, ranging from 65 horsepower single engine to 1200 horsepower twin-engine types. They are equipped with two-way radio, blind-flying instruments and other modern safety equipment.

Pilots must have a valid civil airman certificate with ratings and must demonstrate their ability to handle satisfactorily the planes assigned to them. Many of them are pilots with combat training and experience but they still must meet civilian aircraft requirements.

Christmas Message... "No Choice Left!"

THE only ultimate answer to war is the establishment of a world government based on justice and care for human rights. It is to be hoped that the atomic bomb will suffice to show that disputes must be settled by reason rather than destruction.

Thus speaks one of America's great scientists, Dr. Arthur H. Compton, Nobel prize winner and key man in the atomic bomb program. In a special nucleonics issue of *Monsanto Magazine,* he asserts that "In 1970," in a war that might be fought, "both sides will presumably have atomic weapons available in greater numbers and of greater destructiveness and variety than those now possessed by the United States . . . Because of the enormous advantage of surprise, Pearl Harbor tactics will be employed. Rockets will be launched without warning at each of several hundred of the enemy's major production centers. Hardly any city of over 100,000 population will remain as an effective operating center after the first few minutes of the war . . . The aggressor in this case can expect no mercy. Though his citizens may have moved underground, his great cities as well as his surface factories will be completely annihilated . . ."

Not a pleasing prospect even to think about. But yet, the words are not those of a dullard, nor of a seer of visions. Instead they are the thoughts of a man who knows what he is talking about.

Perhaps Compton's warning is the best Christmas message we can have after all. "Peace on Earth, Good Will toward Men," has not lost its appeal to the human heart, nor will it ever. But to realize its fulfillment, every human being in the world has a task of consecration to the ideal of peace and good will. Mankind must accept the message of the Angels and be willing to give his best to accomplish it, or face destruction. He has no choice left.

Jet engines for aircraft begin to be effective only at the point where propeller driven aircraft must leave off; that is, at speeds above 450 miles an hour, at altitudes greater than 6 to 8 miles, and at power output per engine from 3000 horsepower up.

G. EDWARD PENDRAY, Secretary, American Rocket Society.

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DEPRESSION . . . UNION MADE?

(An Editorial)

THE UNION LABEL is a familiar insignia to more than 130 million Americans who have come to recognize it on many articles as a symbol opposed to sweat-shops and as a banner of progress being made by organized labor in a widening spread of commodities.

Now it appears possible, and even probable, that the label "union made" may be attached to something with which every American has good cause to look forward to with dread—a business depression.

We do not believe that the rank and file of union members desire a depression. We give them credit for believing that every attempt possible by them to increase their individual pay envelopes is an aid toward staving off a depression for each of them.

Probably the thought is far from the minds of the average union member that his demands are beyond the realm of reason. For years he has had pictured to him both his own indispensability and his employer's rascality; that corporate profits are unconscionable and that employes are "ground down".

Labor is indispensable to prosperity—without the slightest question. But labor, in our scheme of things, may be compared with the engine of a car, without which the car cannot function, *excepting down hill.* Yet there is more to the operation of a car than simply the fact that it has an engine in it. *The engine is only one of the indispensable things.*

Surely the intelligent union member whose mind has not been wholly clouded by ill-conceived advice must know that labor alone is not enough to insure prosperity, that when labor stops the whole machine stops and labor, and all other units of the machine, alike share the penalty.

Right now most people we know are looking for employes. Postwar reconversion is handicapped by just one thing—labor, either in end plants or in those supplying these plants with essential materials.

Labor is the chief cost in any manufactured or assembled article and when rates of pay increase all up and down the line, one of two things ultimately must happen: Either the price of the manufactured product goes up or production stops, throwing labor out of employment.

If production costs go up and the price goes up with it, one of two things must happen: The increasing price must stay in line with the ability of the customer to pay or, if it goes up to the point where the customer won't or can't pay the price, again production stops and labor is thrown out of employment.

No company can get away, for long, with a price which is completely out of line with the ability or the willingness of the general customer to pay. Auto manufacturers a long time ago realized that prosperity was more certain when cars were produced in quantity and moved at reasonable prices. They knew the relationship between price and sales before the CIO was born. And today they know how far they can go and still find the size of market they must have in order to keep going.

There is an alternative to a complete stoppage of production resulting from unreasonable increases in costs and prices. That alternative is a change in our form of economy and an accompanying change in our form of government.

We believe that there are many connected with CIO leadership who would welcome such a change. We do not believe that the membership feels that way. Neither, probably, did the rank and file of Germans welcome an ideology which many thought would spell disaster to them—but they followed.

But before there can be a change in our form of economy with its inevitable change in our form of government, something else must happen:

There must be a great depression.

Our general structure today is not in a sound position. If strikes continue, they are liable to throw the whole thing out of gear.

They are already throwing it out of gear.

Expansion plans which would have employed many are now being held up for future review. We know of one company that has halted a program of expansion and modernization calling for an expenditure of $40 million. Building after building, decided upon in the last 15 months, is being given a second look. Prospective owners are afraid. Building costs have jumped until no contractor feels safe in bidding unless he provides for contingencies completely out of reach of the fellow who foots the bill.

Slowly but surely we are working into position for a depression and it will bear the label "union made".

In all of this there is somebody who is going to have a say about it. That somebody is the public, the fellow who foots the ultimate bill—the forgotten man who, because of his number, is slow to arouse to wrath, but whose wrath when stirred, is something to behold.

Yes, the present strike situation can bring on a depression. But when and as it does we may see something come ahead of the ensuing revolution desired by some so-called Americans. That something may be such regulation of labor unions as they dream of only in nightmares.

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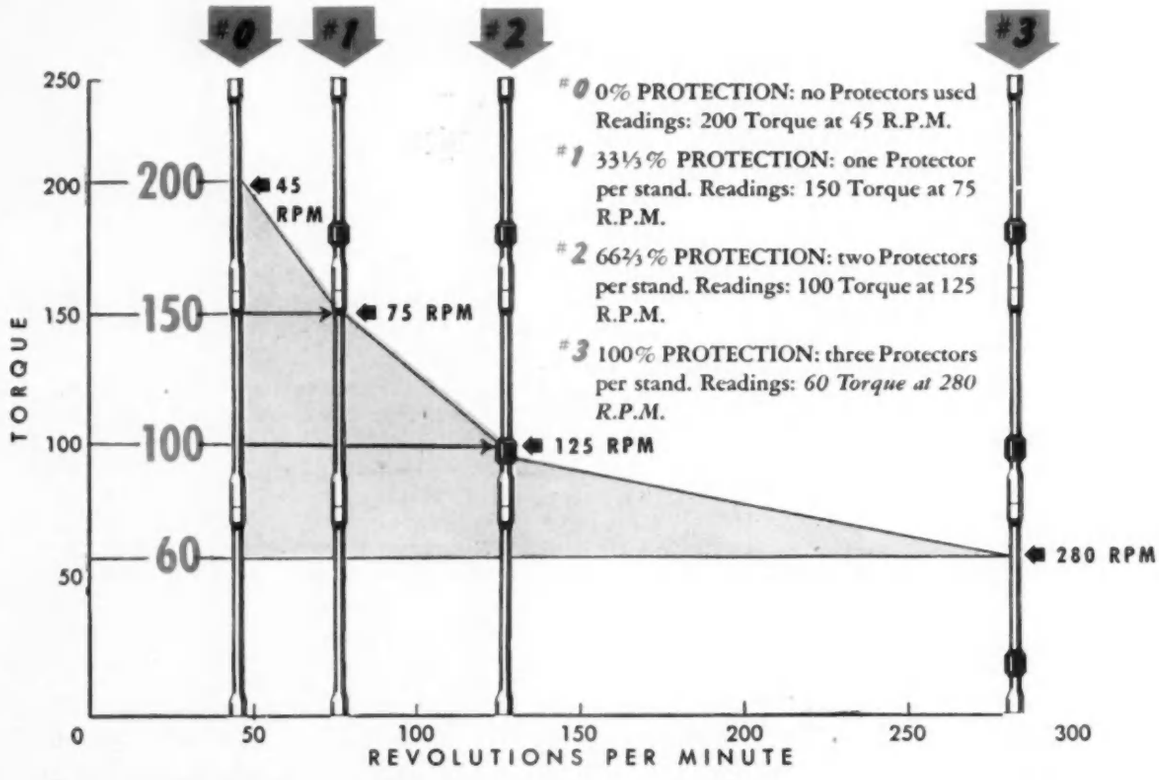

CASE HISTORY No. 3
CHOCOLATE BAYOU
(Well number on Request)

Watch Torque drop as you add protectors! Here's proof about friction . . .

This chart is an actual case at Chocolate Bayou on a rig of a large oil operator. The figures are actual Torque and R.P.M. instrument readings. #0—Without Protectors; #1—Drill Pipe ⅓ protected with one Protector per stand; #2—Drill Pipe ⅔ protected with two Protectors per stand; and, #3—DRILL PIPE 100% PROTECTED with *3 Protectors per stand.*

Note that the greatest reduction of Torque due to friction was when the final ⅓ of the Drill Pipe was covered, proof that for full protection, one Protector at each tool joint should be used

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The Week's News

A PRE-HOLIDAY quietness invaded Washington oil circles last week as Congress prepared to quit for a recess which will not end until January 14.

Fact Finding Difficulties—The fact finding panel appointed by Labor Secretary Schwellenbach to develop a formula for solving the refinery wage controversy got off to a poor start which augured ill for President Truman's new policy for public settlement of labor disputes tangled up over the question whether it had authority to recommend that any wage increase, if found necessary should not be used as the basis for price increases. Page 29.

Tax Prospects—As Congress prepared to quit, notice was served on industry not to expect any further tax relief in the coming year. The 1946 tax bill, Chairman Doughton of the House Ways and Means Committee indicated, will be chiefly devoted to reductions in excise taxes and if any excess revenues are left, to cuts in individual income rates with little chance of further tax aid to business before 1948.

Forecast for January—The Bureau of Mines, faced with unanticipated demand for fuel oils and kerosine, revised its estimates of required January crude production to eliminate a decrease originally figured. The bureau forecasts that next month's out will be approximately at December level. Page 31.

Lead Shortage Continues—Allocations of lead for the manufacture of tetraethyl for gasoline in the first quarter of 1946 will be held to 80 percent of the estimated use this quarter because of a serious shortage of the metal which will necessitate drawing upon the government's stockpile.

Big Inch Future Use—A report to Defense Plant Corporation by an independent enginering firm on the possible postwar uses of the Big Inch pipe lines held them economically usable only as natural gas carriers but warned that in selling or leasing the lines even for that purpose, the government would have to take the greater part of the initial risk and work out a deal in which the ultimate price would depend upon the volume of business developed by the operator. Page 30.

Oil Pact Hearing Set—Because of the prolonged congressional recess, Chairman Connally of the Senate Foreign Relations Committee has postponed hearings on the Anglo-American petroleum agreement, set for January 16, to January 21.

On Auction Block—Two more high-octane refineries put up for sale or lease by the RFC are the Mohawk Petroleum Corporation's plant, Bakersfield, California, and the Pennzoil Company (McClintock) refinery at Oil City, Pennsylvania. Also for sale or lease is the catalyst plant at Fort Worth, formerly operated by American Cyanamid and Chemical Corporation.

Germany's War Ability—Suppression of synthetic rubber and oil plants in Germany are among the suggestions made to a Senate committee last week in an "industrial disarmament" program. Page 28.

Gas Reserves of Nation—AGA has named subcommittee chairmen who will head groups that will estimate gas reserves in each of the nation's PAW districts. Page 29.

API Transportation Director—James E. Moss has been named director of API's new transportation division. Page 29.

Texas Gas Conservation — Recommendations have been made by the oil industry gas committee of Texas relative to gas conservation. Page 32.

IPAA Criticizes PAW—Independents, through their general counsel, charge that during the war they had inadequate representation on PIWC and poor support by PAW. Story below.

Inadequate Representation on PIWC Claimed in IPAA Postwar Statement

With the liquidation of the Petroleum Industry War Council, the Independent Petroleum Association of America last week revealed that throughout the war period the independent domestic producers were allegedly denied adequate representation on the council and adequate support by the Petroleum Administration for War.

In a report on the council to IPAA President B. A. Hardey, General Counsel Russell B. Brown paid tribute to the work of both the industry and government bodies but criticised the inadequate independent representation in the former which he said might have brought about "greater emphasis on the true basis of adequate supply program—the raw material or crude oil."

The manner of selecting the council membership, Brown charged, characterized the attitude of PAW toward the oil industry throughout the war period.

"PAW was the claimant on behalf of the petroleum industry with the several other agencies which controlled materials, manpower and price," he said. "It was a successful claimant on behalf of all elements of the industry except the domestic producers of oil.

"When the producers wanted materials, they received a plausible reason why they could not have materials. When they wanted better recognition of their manpower problems, they were given plausible answers as to why they were not entitled to it.

"When they wanted consideration of their price question, they were met with delays and consideration of this problem was postponed so that the belated presentation of the cause was ineffectual. It has always been puzzling to the producers that the PAW's boasted potency on certain matters should be so lacking on the vital question of crude oil price.

"Every argument which the producer has made for consideration has been verified by the facts. Even the entire membership of the council now recognizes these facts—too late for the council to attempt correction of inequities. The questions remain unsolved but are not incapable of solution."

Abrams New Chairman Standard New Jersey

Ralph W. Gallagher has resigned as chairman of the board and chairman of the executive committee of Standard Oil Company (New Jersey) effective December 31, and will be succeeded by Frank W. Abrams as board chairman. Eugene Holman, president, continues as executive officer and succeeds Gallagher as chairman of the executive committee.

John R. Suman, vice president and director, becomes a member of the executive committee. The board also announced the election of R. T. Haslam, a director since 1942, as vice president and S. P. Coleman, head of the economics coordinating department, as a director.

Connell to Assist With Liquidation of Oil Plants

Leo F. Connell, Washington petroleum engineer, has been named special consultant on petroleum matters to the Foreign Liquidation Commissioner, and his services will be employed in connection with the disposition of government sulpluses overseas of pipe lines, tank cars and storage facilities.

Connell, formerly employed by the Sun

Oil Company at Philadelphia, served with PAW for the past three and one-half years as assistant director of construction and assistant director of materials.

The Foreign Liquidation Commissioner is charged with the disposal of all overseas supplies declared surplus by the Army, Navy and other owning agencies. These surpluses are being sold on a priority basis to American agencies, UNRRA and charitable institutions, to American manufacturers buying their own trade marked products to protect them from resale in foreign markets, and to foreign governments to aid in reconstruction.

No Stockpiling for Petroleum

Petroleum will not be included in the list of critical and strategic materials to be stockpiled by the government against the possibility of another war.

Carrying a specific provision excluding petroleum and petroleum products from the coverage of the act, the Senate on December 20 passed a bill sponsored by Senator Thomas of Utah to amend the 1939 stockpiling act.

Although oil was not included in the measure, it was pointed out by Senator Joseph C. O'Mahoney of Wyoming during the debate that we now have left only 41 percent of our original petroleum reserves. He made no suggestion, however, that oil be brought under the measure.

The omission of oil was due to the inability to develop any economic way of storing the fluid and the general belief that the best storage for it is in its original reservoir.

Complete Suppression of Germany's Synthetic Rubber and Oil Proposed

Complete suppression of Germany's synthetic oil and synthetic rubber industries, and limitation of the refining of natural crude to 750,000 tons per year, eliminating 2,350,000 tons of the Nazi's capacity for war of 3,100,000 tons was proposed by the Foreign Economic Administration's Enemy Branch last week in a program laid before the Senate Military Affairs Subcommittee on War Mobilization.

With the wiping out of the synthetic oil industry and the limitation upon the use of natural crude, most of which is to be taken from domestic fields, it was pointed out, no export prohibition on oil will be necessary in view of the fact that domestic requirements will take all that is permitted to be produced.

The controls to be imposed on oil are part of an "industrial disarmament" program, the effect of which will be to make it impossible for Germany to produce any substantial amount of war material and make her "entirely dependent upon the outside world in supplying minimum civilian needs for a selected list of key materials or products also essential to war; to prevent excessive stockpiling as well as experimentation and pilot plant operations in the eliminated industries, and thus to make Germany vulnerable to blockade and to assure that the rigors of economic sanctions will have maximum impact."

To this end, FEA proposed the closing of all laboratories and research facilities pending an investigation to determine which are engaged in or equipped to develop materials for war, and permanently eliminate or, where feasible, convert for use on permitted peacetime research projects, all laboratories devoted to the study of problems related to synthetic oil and other suppressed industries. All permitted research projects would be made subject to licensing control, but no licenses would be issued for study of synthetic oil and gasoline or synthetic rubber.

Texas Operators Group To Oppose New Oil Pact

Some operators attending the Texas statewide hearing in Austin last week indicated their opposition to the Anglo-American oil treaty and will reorganize the committee which opposed the original treaty. D. W. Hovey of Houston was named as chairman and Ghent Sanderford of Austin was placed in charge of state headquarters at Austin. Operators promised plenty of funds to support the fight.

Among those named as probable members of the committee were: George Moffatt, Al Buchanan, Herman Heep, H. P. Nichols, Elmer Patman, H. P. Cullen, Harold Byrd, C. V. Lyman, Glenn McCarthy and Grady Vaughn.

Chairman Olin Culberson was the only member of the Railroad Commission who attended this meeting.

Suman Outlines Stand in Letter to Russell Brown

The position of the independent producer was "very much in my mind" when he prepared his address delivered before the Texas Mid-Continent Oil & Gas Association (THE OIL WEEKLY, December 17, 1945), John R. Suman, vice president and director of Standard Oil Company (New York), has declared.

Suman's declaration came in a letter to Russell B. Brown, general counsel of the Independent Petroleum Association of America, in which the Jersey official answered the IPAA attorney's criticism of his address before Texas oil men in Fort Worth, November 9.

"Since our basic objectives are the same, it is difficult for me to understand your conclusions," Suman wrote. "The position of the independent producer was very much in my mind when I prepared my paper; in fact, the principal points I tried to make were:

"1. That the oil producers of the United States be permitted to produce all the oil they can produce under sound conservation practices to satisfy an existing market demand for refined products. Under such a policy, imports would come in only to make up any difference which may exist between demand and production or to supply products which are not supplied from the domestic industry under existing refinery practices.

"2. That it is to the benefit of everyone to have the producer, and particularly the independent producer, receive a fair price for the oil he produces, and that means a price adequate to insure the continuance of a strong, virile domestic industry. We need such an industry if we are to find, in the next 20 years, the 30 billion barrels of oil which I assumed would be found. This assumption was a major basis of my discussion.

"3. Quoting from Dr. R. E. Wilson's report for the committee, of which your J. V. Brown is a member, appearing before Senator O'Mahoney's Committee to Investigate Petroleum Resources, I showed that the catalytic cracking capacity of the refineries in the U. S. A. was already 60 percent of the prewar demand and that this would be increased as old equipment wore out. Now these cat crackers simply don't make the heavy fuel oil which is needed now or will be needed in the future. Since they are making products of higher value, which tends to give the crude oil greater value, I would think all producers, large and small, would think this was a very good idea. The existence of the catalytic cracking situation is something factual that must be faced realistically. The shortage of fuel oil incident to this situation falls into the same category.

"I did not say and I do not take the position that fuel oil is 'an inferior byprdouct of our refiners, to be disposed of as a salvage or waste product.' However, all of us must realize that it is in the position of having to be sold into the market in competition with other fuels such as coal. Surely it is wiser for the industry to preserve the prestige and acceptance of liquid fuels by marketing some of them from imported sources, where the domestic production from our modern refineries cannot meet the demand, than to let the market go by default to competitive products."

Governor Kerr to Head Compact for Coming Year

Officers of the Interstate Oil Compact Commission elected at the recent meeting in Wichita, Kansas, include Robert S. Kerr, Governor of Oklahoma, chairman; Hiram M. Dow, of New Mexico, first vice-chairman; and Warwick M. Downing, of Colorado, second vice-chairman. Kerr succeeds Andrew F. Schoeppel, Governor of Kansas.

The executive committee includes R. B. McEntire, of Kansas; Sam H. Jones, of Louisiana; Hiram M. Dow, of New Mexico; Reford Bond, of Oklahoma, and Sidney Latham, of Texas.

In the event governors of these states attend the meetings, they automatically assume the representation of their states, as the men listed are representatives of the governors. During the course of a meeting, each official representative of each state has the right to attend executive meetings and vote. The executive committee of the five states listed is named in order that interim business may be conducted by the Compact at monthly meetings to which most of the states do not send representatives.

The meeting passed a resolution honoring the late Judge J. C. Hunter, Texas representative on the compact for several years. Another resolution supported congressional appropriation for technical studies by the Bureau of Mines, and a third urged the passage of House Concurrent Resolution No. 255 pending before the Senate, which would clear titles to state lands, titles clouded by action before the Supreme Court.

It was indicated that South Dakota and California are likely to become members of the compact soon.

William W. Clary, first assistant attorney general of California, defended that state's claim to submerged lands along the coast, title to which is being contested by the federal government in the suit before the Supreme Court.

The government's case was defended by Warner W. Gardner, solicitor from the Department of the Interior. He claimed "our known oil reserves will be exhausted in perhaps another 12 years of peace, and when, as Secretary Ickes has said, 'we cannot oil another war'."

Gardner drew hearty protests from state representatives present when he continued that "Moreover, the submerged oil fields of California have been used against the national interest. During the years when Japan was building up her petroleum reserves to the point that she dared challenge the United States, she got, according to a Navy report to Congress in 1939, nearly 30 million barrels of crude and refined petroleum products from the California industry in 1937 alone.

Walace Hawkins, attorney for Magnolia Petroleum Company, Dallas, challenged Gardner's statement immediately and pointed out that this oil was shipped with the sanction and knowledge of the State Department and that none of it was controlled in any way by the State of California, so far as marketing is concerned.

"Fact Finders" Off to Poor Start; Sinclair and Refinery Workers Agree

The administration's experiment in the solution of labor controversies through fact-finding panels got off to a poor start last week when the refinery-strike board headed by President Frank P. Graham of the University of North Carolina opened public hearings but found only four of the ten companies involved had sent representatives to Washington.

The board stated early that while it felt empowered to recommend a wage figure it did not think it was authorized to find or recommend whether the companies should seek compensating price increases.

The hearings got under way as one of the companies involved in the strike, Sinclair Oil Corporation, announced that it had settled its own difficulties by granting its workers an 18 percent increase for a basic 40-hour week, its refineries being immediately released by the Navy.

It took the board until December 21 to get a ruling on its authority, and it then recessed until January 7 when it was indicated that several of the companies were about to settle their wage differences with the union.

A memorandum from Secretary Schwellenbach held that the boards could recommend increases within the framework of current federal stabilization regulations.

The adjournment of the oil hearings came before the companies had opportunity to state whether they would be willing to continue in view of the President's decision that prices and profits must be considered, a point they have been vigorously contesting.

Companies reportedly near to an agreement with the union were Standard Oil Company (Ohio), Socony-Vacuum Oil Company and The Atlantic Refining Company. Graham also read a telegram from Shell Oil Company expressing belief that negotiations now in progress will result in an agreement.

Regional Groups Named To Estimate Gas Reserves

Authoritative and dependable estimates of natural gas reserves in each of the five gas producing regions of the country, as well as for the entire nation will be made by regional committees appointed by the Committee on Natural Gas Reserves of the American Gas Association. The five territories will correspond to the PAW districts and the regional committees will comprise outstanding experts in geological and natural gas circles.

Ernest E. Roth, United Fuel Gas Company, Charleston, W. Va., will form the subcommittee for Region 1, comprising Kentucky, New York, Ohio, Pennsylvania, Tennessee, Virginia and West Virginia.

Charles O. Hoffman, Cities Service Gas Company, Oklahoma City, will head District 2, including Illinois, Indiana, Kansas, Michigan, Missouri, North Dakota, Oklahoma and South Dakota.

R. O. Garrett, Arkansas Louisiana Gas Company, Shreveport, La., Perry Olcott, Humble Oil & Refining Company, Houston, and Paul C. White, South West Gas Producing Company, New York, will form the subcommittee for District 3, covering Arkansas, Florida, Louisiana, Mississippi, New Mexico and Texas.

W. T. Nightingale, Mountain Fuel Supply Company, Rock Springs, Wyo., will appoint the subcommittee for District 4, comprised of Colorado, Montana, Utah and Wyoming, and Roy M. Bauer, Southern California Gas Company, Los Angeles, will form a subcommittee for California, District 5.

The committee hopes to have its first report an natural gas reserves ready for presentation at the annual meeting of the Association in Atlantic City in October, 1946.

James Moss Named Director API Transportation Work

James E. Moss, Philadelphia, has been appointed director of the newly-created Division of Transportation of the American Petroleum Institute, President William R. Boyd, Jr., has announced.

James E. Moss

Moss, for many years operations manager of the marine department of The Atlantic Refining Company, was active on the Institute's Committee on Rules for Tank Vessels. In May, 1942, when the United States Coast Guard initiated its program of safeguarding vessels and ports, Moss was "drafted" as its consultant on tankers. Commencing in August of the same year, he devoted his entire effort to the Coast Guard. He also was a member of WLB's panel on tankers.

Establishment of the API Division of Transportation was authorized at the recent meeting of the board of directors at Chicago. B. Brewster Jennings, president of Socony-Vacuum Oil Company, of New York, was elected vice president for transportation.

Offices of the Division of Transportation will be established at Washington, D. C., shortly after the first of the year.

Survey Says Use Big Inch for Gas Or Maintain in Idleness for Next War

Most advantageous disposition of the Big Inch pipe lines would be for use as natural gas carriers, according to a report submitted to the Defense Plant Corporation by Ford, Bacon and Davis, Inc., New York engineers.

Following a three-months' study of the lines, the engineers placed reproduction cost at considerably less than the amounts expended in their construction, reporting the estimated normal cost of reproduction of the Big Inch system, new, at $63,763,475 as of last June 30, and cost of reproduction new less depreciation at $61,293,178. For the Little Big Inch, the estimates were $60,321,071 and $56,934,760, respectively.

Employed by DPC to make a survey of the possible postwar uses for the Big Inch systems, the engineering firm ruled out any chance of their competing with tankers, while if used as common carriers, they would probably have such a low rate of operation based on capacity as to make profits impossible.

The report was seen as ruling out any possibility that the RFC would be able to sell or lease the line for oil service and, in fact, appeared to leave the government little choice between working out a deal for their operation as natural gas carriers and maintaining them in idleness for possible use again in another war.

If the lines are put into use for gas, it was indicated, the operator will have to have full cooperation of distributing companies in the New York-Philadelphia area if a market adequate enough to suport them is to be developed.

At the same time, the engineers warned, if the lines are converted to natural gas movement, the government will have to take most of the risk during the early stages of operation, "and some plan will have to be worked out between a prospective operator and the owner under which the price ultimately paid for the lines will depend upon the amount of business which the operator is able to do."

The engineers were confident that "in the hands of an experienced natural gas operator the two lines can be made to return to the government a greater proportion of their original cost when operated in natural gas service than when handled in any other way."

Tankers Preferred

The Big Inch line can handle crude on a competitive basis with tankers, given capacity supply and operation, but the engineers could not see any chance of the necessary heavy volume of oil and products being available in view of the preference of the major oil companies for the more flexible tanker transportation.

Conclusions reached by the engineers declared "The Big Inch line operating at or near capacity can deliver crude oil from East and Central Texas to its Eastern Seaboard terminals at least as cheaply as can be done by any other method of transportation, but the Little Big Inch products line, on account of its smaller capacity, cannot compete with tanker transportation."

The main pipe lines and branches of the system are readily convertible to the transportation of natural gas the report concludes and an ample supply of natural gas exists close to the lines. The area in which the lines terminate holds the largest concentrated potential natural gas market not now served in the United Sattes.

Delivered Cost of Gas

"The average price at which natural gas can be laid down in the East through the two main line systems acquired at estimated postwar cost of equivalent systems designed for natural gas is approximately 25.35 cents per mcf on the basis of 115,000,000 mcf being sold annually at a load factor of 75 percent. If this price can be obtained, the two main pipe lines and their rights-of-way would have a value of not more than $82,428,500. This average price is somewhat higher than the engineers believe can be obtained, at least initially. At an average price of 20 cents per mcf which should be initially obtainable the earnings will permit an investment of $40,450,000 in the two main line systems including the rights-of-way on which they are built, but not including any feeder and distribution facilities, pumping stations, tankage, electric transmission lines, automobiles, trucks and tools and furniture and fixtures. Any money which could be obtained from the sale of these items would be in addition to these figures." Thus at first, perhaps for 5 years, the government would have to assume the bulk of the risk, the report declared.

"It is possible that the part of the Little Big Inch products system, or even of the 24-inch crude system west of Cincinnati might be sold to interests whom it is understood are requesting a certificate of convenience and necessity from the Federal Power Commission to construct an 18-inch pipe line between the Carthage gas field in northeastern Texas and a point near the city of Cincinnati," the report points out. "If this sale were made the remainder of the line east of Cincinnati would likely have only salvage value."

The engineers reached the conclusion that gas supplies in the immediate vicinities of the termini of both lines may be readily obtained on long term contracts and that the reserves in the feeder areas of both lines are ample to supply the requirements of the lines if converted to gas transportation "without jeopardizing the reserves contracted or required by existing or presently reported proposed lines."

Pointing out that both lines were built for a special purpose, and that "they practically parallel and, in commercial operation, would be partly competitive with" the industry's established pipe line network, the report told DPC that "in general, whatever possibilities may exist for using these lines efficiently in the postwar period as commercial carriers of crude oil and products would have to be worked out within the framework of economic factors and conditions to which the whole American oil industry is subject."

Possible usefulness of the lines will also be directly affected by policies of the government as to disposition of its large fleet of tankers, it was commented.

Both lines, due to their large capacities, would be able to transport oil and products from Texas to the eastern terminal area and to inland points on the lines at very low cost, "if markets could be found . . . and if sources of supply could be found sufficient to assure economic loading of the lines."

However, it was pointed out, costs, operated as commercial carriers, would depend basically not only on the average load factors at which they could be operated but also on the investment a private purchaser would have to make and the fixed charges assumed to finance the purchase and provide for retiring the investment over life of the systems.

The natural desire of the companies which moved their oil by tanker before the war to return to that mode of transportation and the over-supply of war-built tanker capacity, it was stated, will eliminate any important possibility of using either of the lines to supply the New York-Philadelphia area. Unless the system were purchasable at a price lower than the government might find acceptable, the Big Inch line would not be able to meet tanker competition on the basis of transportation costs alone, while the 20-inch line could not compete with tankers on a cost basis and there is no "important possibility" of using it for transporting products to its eastern terminals.

The study showed that there are a number of small independent refiners who would undoubtedly be glad to have their crude supplies transported by the Big Inch line, assuming a lower cost would result, but the aggregate requirement of their refineries is small.

Other Suggestions

A number of suggestions have been advanced for disposition of the lines, among them that if the eastern half of the products line were operated to transport as far northeast as the Mississippi River, for further distribution by barge, the remainder of the line, or at least a great part of it, might find use as a transporter of imported crude from the Eastern Seaboard westward to refineries located in the Middle West.

"It is undoubtedly true that the United States will import relatively more crude in the future than it has in the past, but it would seem logical that this crude would be refined at refineries located on tidewater," the report stated.

Texas Oil Production for January Boosted; Bureau Revises First Figure

Texas daily oil production was boosted sharply last week by the Railroad Commission to meet an acute shortage of fuel oil for heating. The Commission set the January daily production at 2,027,175 barrels and indicated that the allowable production would be increased during the month if demands were not adequately met.

The commission's January proration order permits a maximum daily output of 2,122,696 barrels of crude oil, but estimated under production of 4.5 percent of the allowable would reduce the probable average flow of 2,027,175 barrels. Indicated production of 160,259 barrels daily of natural gasoline and distillates would increase the state's total liquid petroleum production to 2,187,434 barrels.

The next proration hearing was set for January 11, early enough to hear and act on reports of whether or not the increase was enough to meet fuel oil demands.

The allowable increase for January was issued by the Commission in face of a sharp decrease in the estimate of the Bureau of Mines. This estimate was 1,775,000 barrels daily, a reduction of 165,000 barrels daily from December, and 252,175 barrels less than was ordered for the month of January by the Commission.

Washington Explains

Later in the week Washington reported that January crude production estimates of the Bureau of Mines will show no substantial change from December due to a combination of circumstances, the most important of which is the short-supply situation in burning oils—Navy residual and distillate—and kerosine.

The bureau revised its original estimate for Texas which was somewhat below the December figure, giving the state approximately the same daily average as for December and will release its national figures after Christmas, showing that production in all states where winter weather conditions do not contract operations will also remain practically unchanged.

The original Texas estimate, furnished the Texas Railroad Commission in advance of the completion of the full forecast at its request, was based on the assumption of decreased demand in the first quarter of 1946 which indicated that on any progressive reduction basis the cutback in operations should begin in the initial month.

Recently increased military requirements, the necessity to balance up some of the loss in production during the refinery strike, and the tight fuel supply situation, however, combined to offset all previous calculations and indicated that January output would continue at its present level with such reduction as will occur during the coming quarter taking place in subsequent months possibly at a much sharper rate than if the decrease was more evenly distributed over the period.

The bureau's original figures were based on a tentative estimate that first quarter production would average 4.2 million barrels a day maximum as compared with PAW's last estimate of 4.1 million barrels. The figure may still hold true for the quarter as a whole with January production at the December level and sharper than anticipated cuts toward the end of the period, barring the raising of further difficulties such as undue prolongation of severe winter weather, Washington explained.

Imports Blamed

Many of the operators attending last week's hearing at Austin thought the Bureau of Mines had included in its calculation the prospective increase in imported crude. The charge was made that the Department of Interior planned to substitute foreign for domestic crude in some U. S. markets.

The increased Texas allowable production for January was in line with the nominations filed by purchasers at last week's hearing, which were up 74,366 barrels daily to a total of 2,294,962 barrels. All but two districts shared in the increase, and decreases in these total only 180 barrels.

Most of the major companies indicated they were short of crude. Humble Oil & Refining Company asked for 45,600 barrels daily more from the fields to which it is connected. The company estimated its nominations were 63,000 barrels a day more than was produced from these fields in December.

The Sinclair Company was in similar condition and is drawing 10,000 barrels daily from stocks at the present time. Paul McDermott, in supporting his contention that the Bureau of Mines must be taking foreign crude into account, read from THE OIL WEEKLY a statement by Russell Brown, general counsel for the Independent Petroleum Association of America, which made this charge and which objected to the use of foreign oil in American markets.

Gulf Oil Corporation asked for 4500 more barrels daily from Stowell and 4100 barrels from Thompson. Gulf also reported that it had completed its new 8-inch line from the Keystone-Ellenburger field to its Midland station in West Texas, and asked 31,000 barrels daily from the field, an increase of 10,000 barrels daily.

Sun Oil Company reported that it was drawing on stocks at the rate of 3200 barrels daily. Republic Oil Refining Company asserted that it needed 328,000 barrels more in January, if it is to fill its commitments and maintain its stocks.

Pressure Decline Reported

The Commission reported a decline of .93 pounds in the East Texas bottom hole pressure during November, when production of oil averaged 318,914 barrels daily.

The indicated increase for January was accomplished by adding one producing day generally to fields over the state. Thus, East Texas, which had 20 producing days in December, will have 21 in January. Generally, the order calls for 26 producing days in January compared with 25 in December. The Panhandle field remained unchanged.

Crude Oil Production in the United States

(Estimates compiled by the OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED Dec. 22	Dec. 15
Alabama	150	700
Arkansas	75,900	76,000
California	847,000	841,000
Colorado	20,450	20,950
Florida	100	125
Illinois	201,900	208,800
Indiana	12,750	14,100
Kansas	256,450	264,850
Kentucky	28,900	29,950
Louisiana	371,450	370,850
North Louisiana	76,150	75,500
South Louisiana	295,300	295,350
Michigan	48,900	43,100
Mississippi	54,500	53,600
Missouri	100	100
Montana	20,300	20,300
Nebraska	750	750
New Mexico	98,750	97,900
New York	13,150	13,450
Ohio	6,800	7,000
Oklahoma	385,350	387,500
Pennsylvania	32,750	31,550
Tennessee	35	35
Texas	1,922,400	1,917,400
Upper Gulf Coast	469,000	470,500
East Texas Field	307,100	307,000
Rest of Eastern Texas	135,300	129,300
Southwest Texas	314,500	314,500
West Texas	465,800	465,450
North Texas	149,700	149,600
Panhandle	81,000	81,050
West Virginia	8,100	6,900
Wyoming	93,550	90,250
Total United States	4,500,485	4,497,160

Important

The paper shortage is still acute. Legal restrictions have been lifted to permit a publisher to use as much paper as he can buy. But try and get it!

Consequently we are printing a very limited number of extra copies of the 1946 Yearbook-Forecast Number of The OIL WEEKLY, to be published February 11.

Every effort should be made right away to ascertain your requirements for extra copies and to get this information to us before February 1 to enable us to compute our print order and locate the necessary amount of paper.

Your immediate attention to this will forestall possible disappointment after the Yearbook-Forecast Number is off the presses. Extra copies—$1 each.

Long and Short Term Conservation Plans Recommended for Texas Gas

Recommendations of the Texas oil industry gas committee, made public by the Railroad Commission last week, reveal both long and short term recommendations to aid in conservation of gas in Texas.

The Committee concentrated its efforts on 177 fields each of which produce more than one million cubic feet of gas daily. These fields contain 59 percent, or 59,121 of the oil wells in the state and produce 1,837,022 barrels or 85 percent of Texas' oil (March, 1945, figures.) With the oil came 1920 million cubic feet of gas, and 242 million feet were used for gas lift.

Flared gas from these fields totalled 1233 million feet per day or 57 percent of the total produced. The committee estimated that the recommendations made could result in reducing gas flared by 300 million feet of gas per day immediately. The recommendations were as follows:

1. A "more realistic control" of gas oil ratios. The present ratio of 2000/1 is "too high to conform with necessities. No new principle would be involved in the immediate reduction of the permitted ratio in each field to more reasonably approach the original dissolved gas-oil ratio... A substantial step forward... might be the reduction of exemptions in excess of the statewide limit." Field studies were suggested to reduce ratios.

2. There should be an immediate reduction in the gas well gas used for gas lift. The present limit is 10,000 per barrel. The committee recommends limits "materially below this volume."

3. "Granting of exceptions to gas-oil ratios merely because produced casinghead is marketed is not compatible with sound oil conservation." The practice particularly is not justified where there is an appreciable percentage of low ratio wells in a field.

Long Term Program

The long term program:

1. The permitted ratio should be fixed by consideration of the field as a whole; to serve these ends: facilitate the maximum efficient recovery; and conserve gas where such conservation is economically sound. This ratio should approach the dissolved gas ratio. High ratio wells should not be limited by volumetric withdrawal but should be shut in. Return to the producing horizon of the excess gas should be the sole permitted exception to closing in wells.

2. A gas well in the gas cap of an oil reservoir should not be produced. An exception may be made for gas cycling operations where the gas is continuously injected into the same reservoir provided the volume withdrawn is injected and provided it does not alter the gas oil interface.

3. Casinghead gas should be returned to the reservoir except when conclusive evidence shows such return is not economically required. It may be expected that such gas return will be required in most water drive fields.

4. In fields where needful, restriction of water production or return of produced water to the reservoir should be required.

Casinghead Gas

5. The use of sweet or sour gas for gas lift followed by venting of the gas should be discontinued. Nor should the venting of a portion of the gas be permitted. Compression and reuse of the casinghead gas for gas lift is not objectionable.

6. Casinghead gas should not be marketed for any use except when prior and superceding requirements under 1, 2, and 3, above, have been met. The market for gas is not now such nor is it apt to be in the reasonable future to become such as to require the waste of oil to meet the demands. Conversely it is imperative that markets be made available for that volume of casinghead which is economically available.

7. After reasonable development shows the problems of reservoir control, venting, or flaring of the casinghead should be prohibited except after hearing. Casinghead gas should never be vented where a market exists.

8. Metering of all gas should be required and accurately reported.

Hayden Medal in Geology Awarded Dr. J. A. Cushman

Dr. Joseph A. Cushman, paleontologist of Sharon, Mass., was recently awarded the Hayden Gold Medal in Geology by the Academy of Natural Sciences of Philadelphia. The presentation was made by J. Edgar Pew, vice president of Sun Oil Company.

Dr. J. A. Cushman

The Hayden Memorial Geological Award was founded in 1888 by Mrs. Emma W. Hayden in memory of her husband, Dr. Ferdinand V. Hayden, member of the Academy, distinguished geologist, and one-time director of the United States Geological Survey. It is given every three years "as a reward for the best publication, exploration discovery or research in the sciences of geology and paleontology, or in such particular branches thereof as may be designated."

Dr. Cushman's volume, "Foraminifera, Their Classification and Economic Use," is regarded by scientists as the source book in this field. He was graduated from Harvard in 1903. For a time he was a director of the museum of the Boston Society of Natural History. Later he was a lecturer in Harvard. Since 1940 he has conducted his researches in his own laboratory, in Sharon.

Price Increase Allowed in Face of Eastern Shortage

Moving to check a threatened shortage of kerosine and heating oils along the Eastern seaboard this winter, the Office of Price Administration last week granted temporary increases in price ceilings of ½-cent a gallon for kerosine range oil and No. 1 fuel oil and 2/10 of a cent for Nos. 2, 3 and 4 fuel oils.

The increases to run from December 19 to April 30, 1946, will apply to all of District No. 1 except on sales for export or sales to exporters or on sales to or within the scheduled area comprising most of West Virginia and the western portions of New York and Pennsylvania. The increases also will apply in District No. 3 but only on sales by refiners and tanker terminals for shipment to ultimate destinations in District No. 1.

OPA action was based on a recommendation by the East Coast Fuel Oil Industry Advisory Committee, appointed to study the Atlantic Coast situation, but did not equal their suggestion of a 5/8-cent increase on kerosine, ½-cent on distillate fuel oils and 10 cents a barrel on residual fuel oil.

Texas Offering Higher Pay to Keep Key Oil Men

The Texas Railroad Commission, in an unprecedented move last week, created a new top job in the oil and gas division providing for a salary of $7750 per year for a chief engineer. Commission Chairman Olin Culberson said he would join with his colleagues in granting this salary to Jack Baumel who has been director of production for the past few years at $5000.

Baumel had turned in his resignation effective January 1, 1946, because he said the salary was too low. Under provisions of the appropriations bill, the Attorney General ruled that the commission might create the new job, pay a salary comparable with that paid top jobs in other state departments. The chief engineer of the Highway Department gets $7750 per year, and the Attorney General ruled the Railroad Commission could pay the same amount.

It is expected that the commission will advance Clark Lloyd from chief enforcement officer to director of production and pay him the $5000 salary Baumel has been getting. He, too, had resigned, but may be attracted by the higher pay.

The two are key men in the commission's oil and gas division where they are in charge of proration.

Gus Strauss has resigned, effective January 1, as director of the commission's Gas Utilities and Liquefied Petroleum Gas Division and will be succeeded by S. C. McIntosh.

Millions of boys home or on their way...the sorrow of absence replaced by the joy of reunion in millions of hearts . . . all the world at peace—truly, we have much to be thankful for this Christmas. May you and yours enjoy a full measure of its happiness.
Gaso Pump & Burner Mfg. Co. . . . Tulsa, Oklahoma

PROFITS FROM OIL FIELD WASTES

By H. L. Stevenson, Acid Engineering Company

WHILE the disposal of salt water is one of the greatest problems confronting the oil producer, the smart operator may be able to turn this liability into a real asset provided he takes the time to study conditions and, when necessary, secure the cooperation of other producers in the field. It is well known that brines contain valuable elements which generally are being overlooked and permitted to waste. A judicious study of the problem by competent chemical engineers may indicate the feasibility of installing a reclaiming plant which can serve a number of small leases. This practice is not entirely new although it has been confined to few fields and is being undertaken by some major oil companies. A brine reclamation plant designed at comparatively small expense is quite feasible in many oil fields where salt water contains marketable and recoverable chemicals. It remains for operators to get together and, first, obtain expert advice on the constituency of the brine which their oil wells produce and, second, if chemical analyses prove that it is profitable to process the salt water, then to form a pool and install the type plant suited for their particular purpose. Such an operation will pay the expenses of salt water disposal and, in many instances, result in a handsome profit.

As the oil fields grow older the oil-water ratio gradually changes, and, as a general rule, the oil percentage decreases as the water percentage increases. Thus, as the profit realized from the sale of oil becomes less, the cost of salt water disposition grows.

The salt water disposal problem has been handled in various ways in different areas. The most popular method in the Mid-western fields is to return the water to some sub-surface reservoir by means of a salt water disposal or in-put well. The well may be from 350 to 1000 feet in depth, and will have an outlet in some non-productive sand. Often the only available sand formation will be too tight to allow natural drainage and the water must be pumped down the well. Sometimes the salt water will contain some gyp which will deposit in the pipe and on the formation surface. This gyp may be removed with the aid of hydrochloric acid which will open up the formation area.

Whether the water is returned to the sub-surface or carried off by pipe line, there is always a certain amount of cost and trouble associated with its disposal. Each barrel of this water contains certain amounts of chemicals and could be processed with saleable materials as a result. The feasibility of such a project would depend, of course, on the amount of brine to be disposed of and the concentration of chemicals in the liquid. It might be possible for several producers to combine the salt water from their different leases in order to obtain a sufficient amount. A chemical analysis can be made in any laboratory.

The three major chemicals found in brine water are magnesium, sodium and calcium. There also may be found small amounts of iodine, bromine and ammonium. Usually these, with the exception of bromine, are not present in sufficient quantity to support the cost of manufacture. Some California oil field brines, however, do contain considerable iodine, and plants for its manufacture are profitably maintained. The average oil producer would be more interested in manufacturing the type of chemical which could be processed economically and disposed of through the local markets. For example, common salt (sodium chloride) is used everywhere and even the cheaper grades have an outlet in every community. The cost of building a plant sufficient to make all grades of salt sold on the market would be too great for the small producer to consider; however, a small plant for the cheaper and unrefined product could be profitable.

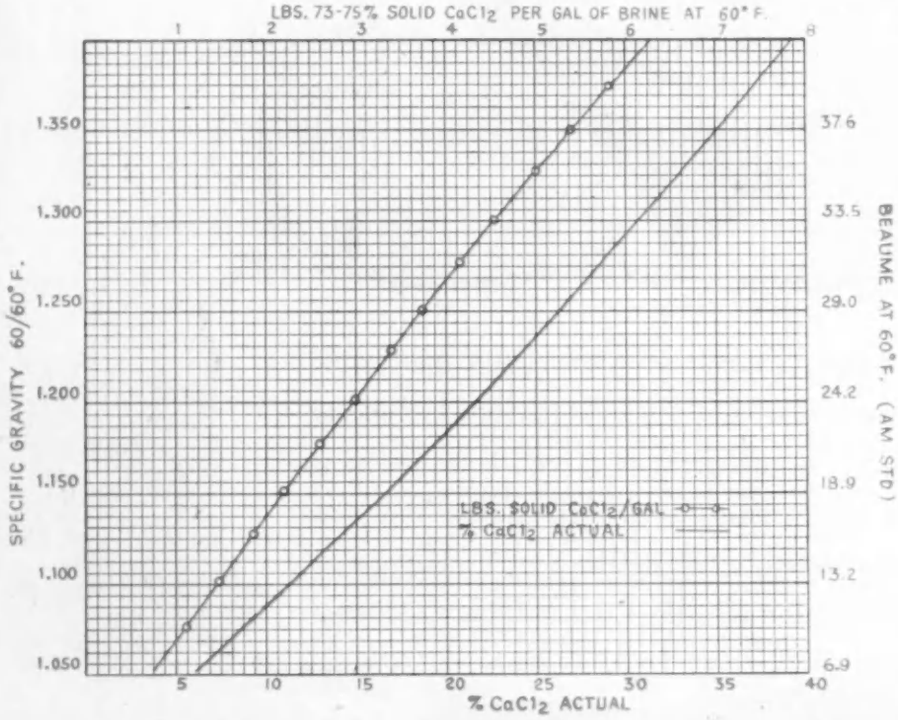


Figure 1. Densities and concentrations of calcium chloride brines.

Magnesium Products

As a rule magnesium is present in all brine waters as a chloride. The addition of lime to the brine water will cause the magniseum to precipitate as magnesium hydroxide and in this form it can be separated from the brine solution. Fresh water or, better still, brine water can be added to the lime to make a lime slurry. Add slurry to brine solution.

$$MgCl_2 + Ca(OH)_2 \rightarrow CaCl_2 + Mg(OH)_2 \uparrow$$

After thorough agitation the brine-lime mixtures flows through a settling vat or "thickener." This vessel should be large enough to allow the liquid ample settling time and should be slightly cone-shaped in order that the magnesium hydroxide slurry can be drawn off the bottom. The magnesium-free salt water will escape over the top through a flume. The hydroxide can be purified with a mechanical filter which is equipped with a vacuum pump, the hydroxide remaining on the cloth while the salt water is pulled through by the vacuum. The purification desired will determine the number of times the hydroxide should be filtered. If fresh water is used for a wash and the hydroxide filtered three times, an almost pure product can be obtained. Magnesium hydroxide is

better known as milk of magnesia, and may be sold for medicinal purposes. As such it must be in a very pure state according to the pure food and drug standards.

Epsom salts can be made from the hydroxide slurry by the addition of sulfuric acid.

$Mg(OH)_2 + H_2SO_4 \rightarrow MgSO_4$ plus water of crystallization.

Upon addition of the H_2SO_4, epsom salt solution is formed and, if water is evaporated from this solution, the salt can be recovered in the form of crystals. Care must be taken when adding the H_2SO_4 as the reaction is violent and much heat is generated. A lead-lined agitator should be used. For the production of a technical grade of salt the solution can be evaporated until the crystals are formed. This can be accomplished in a spray-pond which is equipped with a steam heat exchanger and drags for removing the crystals. To make the pure, or USP grade, more time, care and equipment are needed. The magnesium hydroxide slurry must be filtered enough times to remove all chlorides, and the epsom solution must be filtered to remove iron compounds. A Sweetland filter can be used for the latter. To produce the well known "needle crystal" the solution must be evaporated to a definite gravity; otherwise sugar or coarse salt will result. USP epsom salt has a definite water content ($MgSo_4 \cdot 7\,H_2O$) and this compound must be carefully dried. There is a ready market for USP salt both as a medicine and as a bath salt.

After the magnesium has been extracted from the brine water, only further evaporation is necessary to form sodium chloride crystals. At times the brine is allowed to remain in large concrete pits until the heat from the sun causes evaporation. A more rapid and continual process is the spray-pond and exchanger method. Often waste heat can be utilized to evaporate the water, but when this method is employed the correct metals are necessary to insure against corrosion. Brass is noted for its durability and some of the new plastics promise to be even more efficient in ability to withstand brine corrosion.

In any event, when the brine has been sufficiently evaporated sodium chloride will drop out of solution. Any calcium present will be retained in solution if further evaporation is stopped after the sodium chloride has been precipitated. The salt can be dragged from the bottom of the pond at once, as no settling time is needed. It can be sold in bulk truck-load lots or sacked and shipped. If a hydraulic press is installed, salt blocks can be made. There is a constant demand for salt blocks in every stock-raising community.

After the sodium chloride has been extracted the remaining brine solution contains calcium chloride. The solution is further evaporated and, while in a heated state, flaked calcium chloride can be obtained by rotating a water-cooled cylinder in the solution and flaking off the salt which crystallizes on the cool surface. (See Figure 1 for solution concentrations). Care must be taken in the drying of these crystals, otherwise the water of crystallization may be lost.

Calcium chloride is used on roads as a dust settler and in colder climates is used extensively for melting ice on the highways. When put in tractor tires calcium chloride will increase the traction power. One of the most important uses for this chemical is in construction work. The addition of calcium chloride to cement has proved to be invaluable in setting and strengthening the resulting concrete. (See Figure 2).

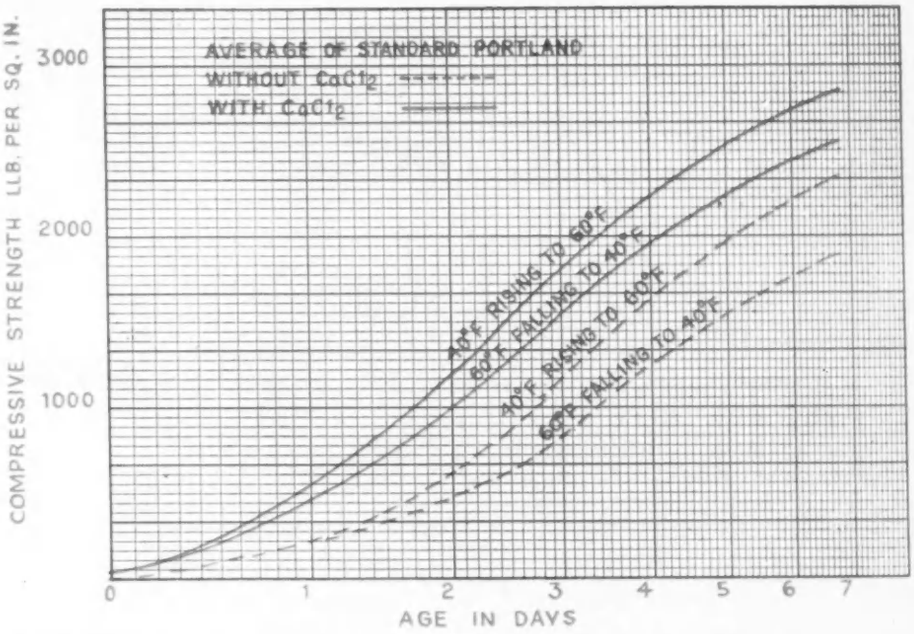


Figure 2. Effect of rising and lowering temperatures on strength of concrete (Chart from American Road Builders Association).

If calcium promide is present in sufficient quantities the bromine can be extracted from the brine. This is done by the addition of chlorine gas to the brine solution before the calcium has been removed. A series of glass-lined stills is used to extract the bromine and glass tubes or pipes carry the gas to the recovery system. It is an expensive process but it is possible to operate such a plant at a profit if enough bromine is present and a ready market available.

Bromine is used extensively by the Ethyl Corporation in the manufacture of tetraethyllead; it is also used in the manufacture of photographic film. In recent years bromine has been found to be as effective as chlorine for water purification and, in some cases, more desirable as the bromine will stay in solution at higher temperatures.

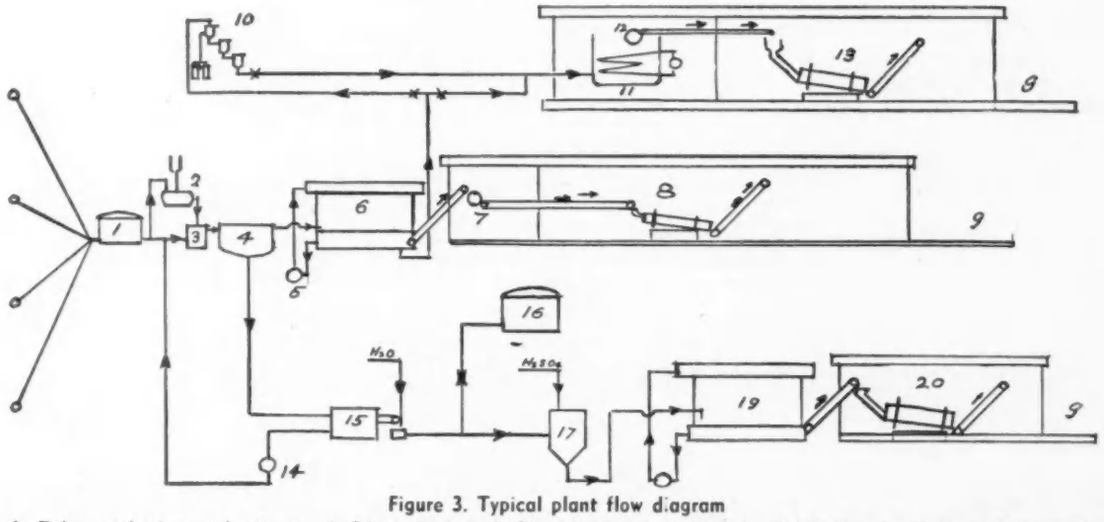
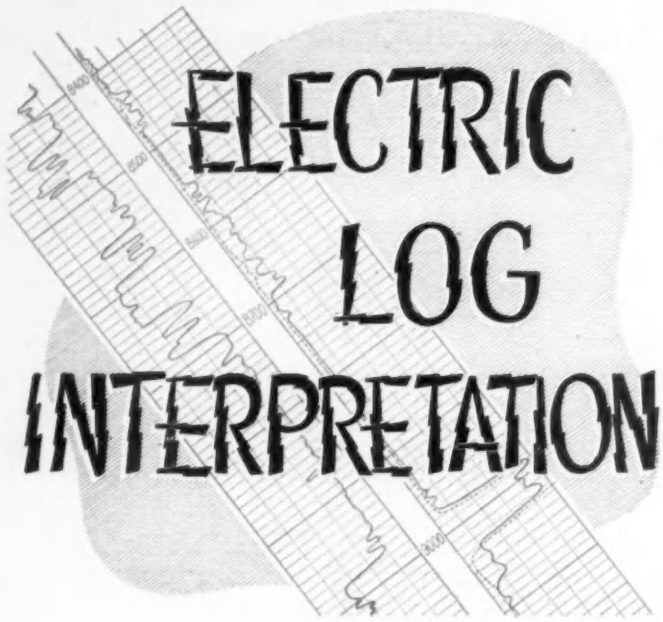


Figure 3. Typical plant flow diagram

1, Brine gathering and storage. 2, Lime slacker. 3, Lime brine agitator. 4, Thickener. 5, Heat exchanger. 6, Concentrator. 7, NaCl filter room. 8, NaCl dryer and storage. 9, Loading docks. 10, Bromine-iodine extraction. 11, $CaCl_2$ concentrator. 12, $CaCl_2$ flaker. 13, $CaCl_2$ dryer and storage. 14, Vacuum pump. 15, $Mg(OH)_2$ filter. 16, $Mg(OH)_2$ storage. 17, Epsom agitator. 18, Heat exchanger. 19, Epsom concentrator. 20, Dryer and storage.



ELECTRIC LOG INTERPRETATION

Part 4

Estimation of Petroleum Saturation

The importance of considering true resistivity data rather than the apparent resistivity values given by an electric log has been discussed in a preceding article. The present treatment explains how these data can be used to estimate the petroleum saturation of sand-type reservoirs.

AN INVESTIGATION of sand-type media* has shown that their resistivity is controlled by the four following quantities:

Petroleum saturation,
Resistivity of interstitial water,
Effective porosity,
Degree of cementation of sand.

When an electric log is available, the petroleum saturation of a sand can, therefore, be considered as being a function of four factors, namely:

its resistivity,
the resistivity of its interstitial water,
its porosity,
its degree of cementation.

Any log interpretation which does not take into consideration—explicitly or implicitly—all the foregoing factors will be unsuccessful in most cases. Figures 1 and 2 illustrate this point.

Figure 1 represents the electric log of two Gulf Coast wells drilled under the same conditions (time, hole size, depth, mud). The logs are very similar as far as potential and resistance values are concerned. Yet, the well whose log is to the left of the figure produces oil at 4228 feet and no water, while the log to the right is from a well making only water.

The same remarks can be made regarding the logs of Figure 2, both from South Texas wells. The log to the left represents oil sands, while that to the right shows only water sands.

Similar cases are found in great numbers in every oil province.

The foregoing examples illustrate the important fact that an oil sand and a water sand may have identical electrical characteristics.

Electric Logs Alone Insufficient

How is it then possible to distinguish one from the other from an electrical log? The distinction is usually impossible unless additional data are available. These essential data are the last three factors listed at the beginning of this section. Roughly, then, an electric log provides only about one-fourth the information which is necessary for the detection of petroleum in a sand-type reservoir. Such a log is evidently a very imperfect tool when used alone. On the other hand, when coordinated with other data, it is extremely useful for the location of oil and gas.

It is true, in many cases, that petroleum geologists make good interpretations by a mere visual inspection of an electric log, i.e., from electrical data alone. This is possible, however, only because of their local knowledge of the area in which they are operating. On the strength of this knowledge they unthinkingly assume that in a particular well the pertinent factors have the same (and usually unknown) values as those existing in other wells of the same area. The same men are always unable to interpret correctly electric logs made in provinces with which they are not familiar. Incidentally, the most able electric log expert or geophysicist would not fare better in unknown territories.

The purpose of the method of interpretation which will be offered below is to explain how, in practice, all available information can be coordinated with electric log data for estimating the petroleum saturation of "sands" (sands, sandstones, and limestones and dolomites which are not fractured and which do not possess appreciable secondary por-

* See Part 1 of this series. THE OIL WEEKLY, December 3, 1945, for reservoir classification used in this work.

Table 1. Interpretation of Logs Shown on Figures 1 and 2

Reservoir Investigated	Description of Reservoir	Resistivity	Total Resistance Increase	Porosity (%)	Cementation Factor	Point on Chart No. 1	Increase Due to Reservoir	Residual Increase	Interstitial Water Salinity (ppm)	Point on Chart No. 2	Estimated Saturation	Conclusion
A—Fig. 1.....	Soft Sand	1.4	14	31	1.3	M	1.4	10	90,000	N	62%	Commercial saturation provided sand not too permeable.
B—Fig. 1.....	Slightly Cemented Sand	1.4	14	18	1.4	R	3.3	4.2	38,000	S	10%	Water.
C—Fig. 2.....	Soft Sand	8	80	26	1.3	T	1.8	44	100,000	V	82%	Commercial saturation.
D—Fig. 2.....	Sandstone	8	80	12	1.9	W	17	4.6	30,000	X	6%	Water.

osity). The method is not applicable to fractured or cavernous media.

Analytical Expression

Experimental data obtained on a large number of samples have shown that the resistivity of a sand can be expressed by the following equation:

$$\rho = \frac{R_w}{P^m (1-S)^2} \qquad (1)$$

where:

R_w designates the resistivity of interstitial water,
P, the porosity fraction,
S, the oil or gas saturation (fraction of pore space),
m, the cementation factor.

This expression shows that the sand resistivity is a function of the petroleum saturation and of three other factors. The influence of each of these latter factors in controlling the resistivity of the sand is about as great as the influence of the saturation, as will be seen shortly. Disregarding these factors would lead to numerous errors of interpretation, such as unwarranted abandoning of exploratory wells, unnecessary pipe setting, etc.

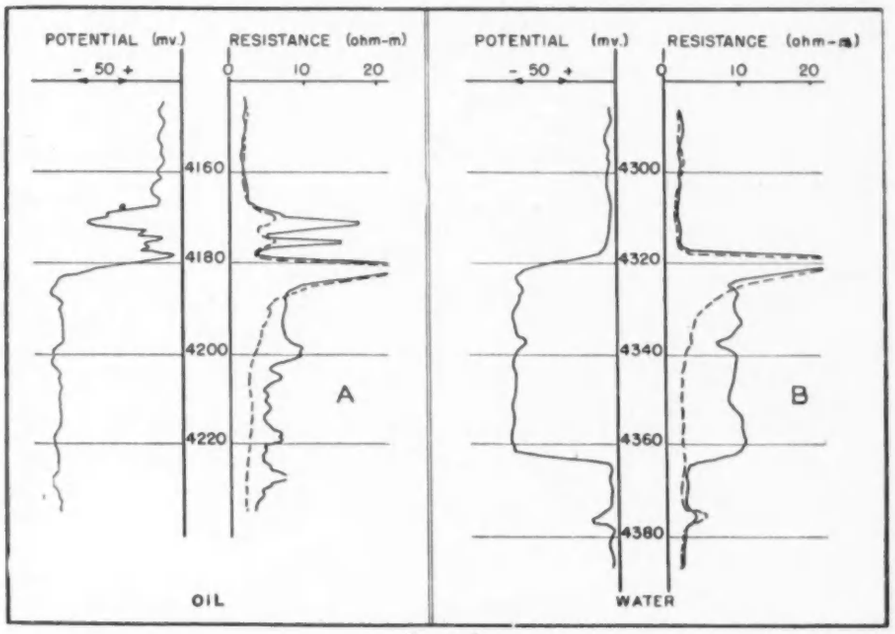


Figure 1

Influence of Petroleum Saturation

To illustrate the influence of petroleum saturation on the electrical resistance, the case of any particular sand will be considered. This sand may have any porosity, it may or it may not be cemented, and the salinity of its interstitial water may have any value. The following discussion will apply quantitatively in every case, provided all these factors are assumed to remain constant throughout the discussion.

The specific resistance of the sand, when saturated with water, has a given value, R. This number may equal anything from about 1/10 of one ohm to several hundreds ohms, depending on the value of the three factors, R_w, P and m. The exact numerical value of R is immaterial for the present purpose.

If the petroleum saturation is increased from its initial value of zero to about 90 percent of the pore space, the resistance of the sand increases steadily, as shown on Figure 3. At 30 percent saturation the resistance is only about twice what it was at no saturation, while at 70 percent saturation there is a tenfold increase, and a considerably larger one at still greater saturations. This particular trend facilitates considerably qualitative interpretations. In fact, it shows that non-commercial saturations do not materially increase the resistance of a sand, while commercial saturations result in extremely large increases. It is for this reason that resistivity is such a sensitive detector of commercial saturation. As a matter of fact, it probably is the most sensitive indirect saturation detector available at present.

Influence of Water Salinity

The resistivity of the interstitial water of a sand is one of the factors conrtolling the resistivity of the sand. In practice, however, it is much more convenient to consider, instead of the resistivity of the water, the total water salinity. It is found that the salinity of the usual oil field waters is approximately equal to the reciprocal of their resistivity (provided the proper units are selected). As salinity data are more easily available in companies' files than resistivity data, only the former will be used in this discussion.

To better understand the effect of the water salinity on the resistivity, the case of a particular sand will be considered. This sand may have any porosity, any cementation and any petroleum saturation. The following discussion will apply quantitatively regardless of these conditions. It will be assumed that the sand carries a water whose salinity is 200.000 parts per million—one of the highest salinity values found in oil field waters—and that the resulting sand resistance equals R.

Fgure 4 illustrates the resistance changes caused by salinity changes. If the salinity decreases, the resistance increases. The rate of increase, however, is variable. At high concentrations a given salinity change causes only small resistance variations, while the same salinity change causes much greater resistance variations at low concentrations. For instance, if the salinity decreases 50,000 ppm, from 200,000 ppm to 150,000 ppm, R increases only 1.3 times. But it increases 6.3 when the same salinity change occurs from 55,000 ppm to 5000 ppm.

To summarize, fairly large salinity variations will not change appreciably the resistance of sands when the inter-

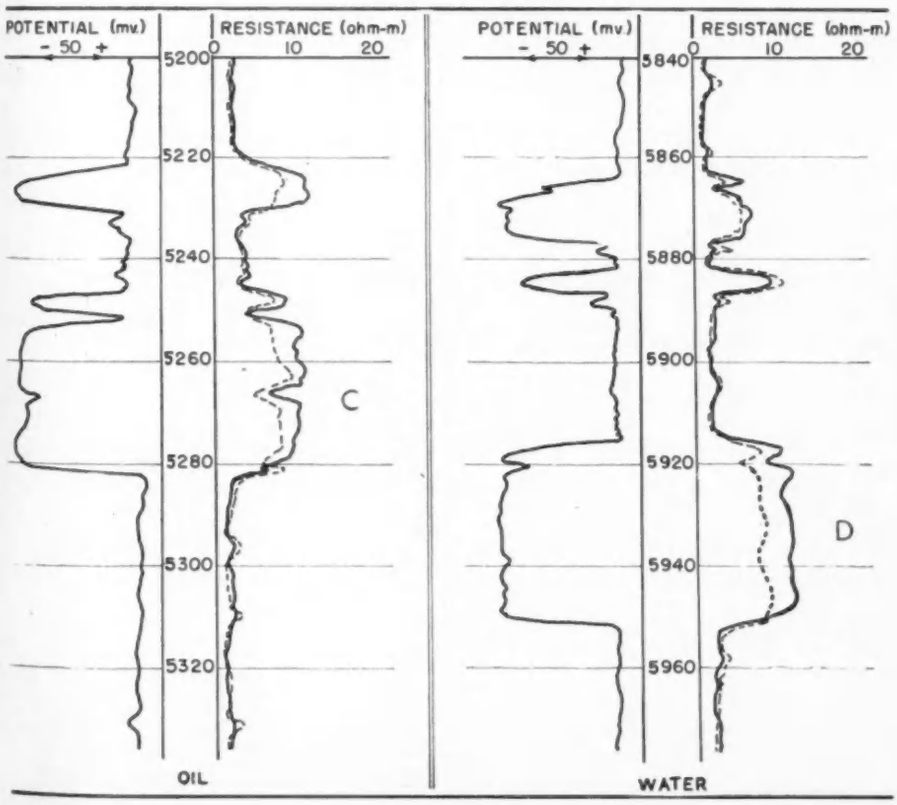


Figure 2

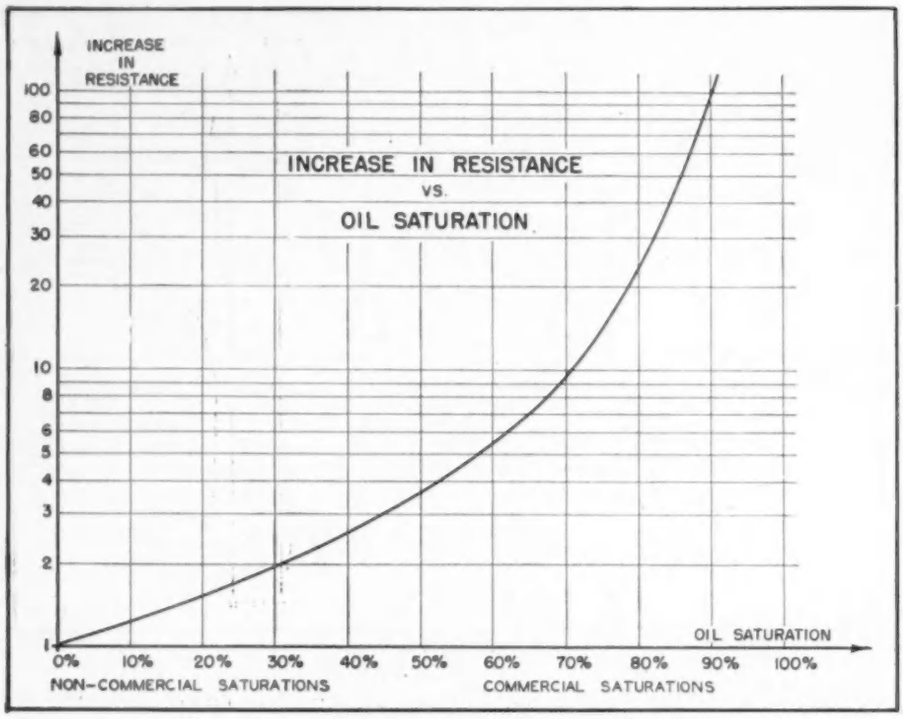


Figure 3. Resistance changes in terms of saturation.

stitial water is very salty, but they will influence it much more when the water is brackish. As far as electric log interpretation is concerned, no important mistakes will be made, in general, by using approximate values of water salinity, provided the water is salty. When the interstitial water is brackish, much greater absolute accuracy is necessary to make successful interpretations.

Influence of Porosity

Figure 5 illustrates the changes of resistance of two hypothetical sands whose porosity decreases gradually from a maximum of 40 percent to extremely small values. Curve 1 refers to a non-cemented sand, and curve 2 to a moderately cemented reservoir, a sandstone for example.

These graphs show that a decrease in porosity results in an increase in resistance. In very porous media, a small porosity reduction—5 percent, for example—produces only negligible changes in resistance, whereas the same reduction causes much greater resistance increases in media of small porosity. For instance, a non-cemented sand having a 25 percent porosity is only 1.25 times more resistant than a similar sand whose porosity is 30 percent. There would be a threefold increase if the same porosity change would occur for a medium of 10 percent porosity.

Another remark which should be made is that the rate of resistance increase is much greater for formations which are cemented than for those which are not. This is illustrated by the relative position of Curves 1 and 2 of Figure 5.

In practice, no large error will be made by using approximate porosity values when it is known that a sand is fairly porous. More accuracy is desired for the interpretation of logs made in tighter formations.

Influence of Cementation

Sand-type media are frequently cemented. This cementation results in larger resistance values, all other factors remaining the same.

It is usually impossible to express the degree of mineralogical cementation of a formation by a numerical factor which can be used for electric log interpretation. The factor m of equation (1) is an electrical cementation factor. Its relation to the geometry and degree of actual cementation is very complex, and it is unkonwn at present. This factor m can be determined accurately only by electrical testing of a sample.

From statistical data it has been found that the factor m equals about 1.3 in non-cemented sands, and that it averages about 1.8 in sandstones and usually more than 2 in limes and dolomites. In practice, all values above 1.3 are found, and the preceding figures are given only as examples of typical formations.

The effect of the degree of cementation on the resistance of a reservoir is represented by the chart of Figure 6, taking as a reference point a hypothetical non-cemented medium whose porosity is assumed to be constant and equal to 10 percent. This chart shows that, because of their cementation alone, sandstones are several times more resistant than sands, while limes are at least eight times more resistant than sands, all other factors remaining the same.

Similar results would be obtained for any porosity value, but the rate of resistance increase is greater for media which are little porous than for those having an appreciable porosity. In practice, increased cementation usually results in a decrease in porosity, and it is of course necessary to take both factors into consideration when interpreting an electric log.

The foregoing discussion of the effect of cementation applies regardless of the fluid content—oil, gas and/or water—of the reservoir considered.

Summary

A relatively high resistance exhibited by a sand is not necessarily due to a commercial petroleum saturation. It may be caused also by one or several of the following occurrences:

(1). Small interstitial water salinity (as is frequently the case in South Texas),

(2). Small porosity (tight formations)

(3). Mineralogical cementation (sandstones, limes, etc—.)

How all of these factors can be taken into account simultaneously for the interpretation of the resistance data will be explained in the following sections.

Application of Data

Equation (1) discussed above gives the resistivity of sand-type media in terms of all pertinent factors.

In practice, the information which is desired is not the resistivity, but the

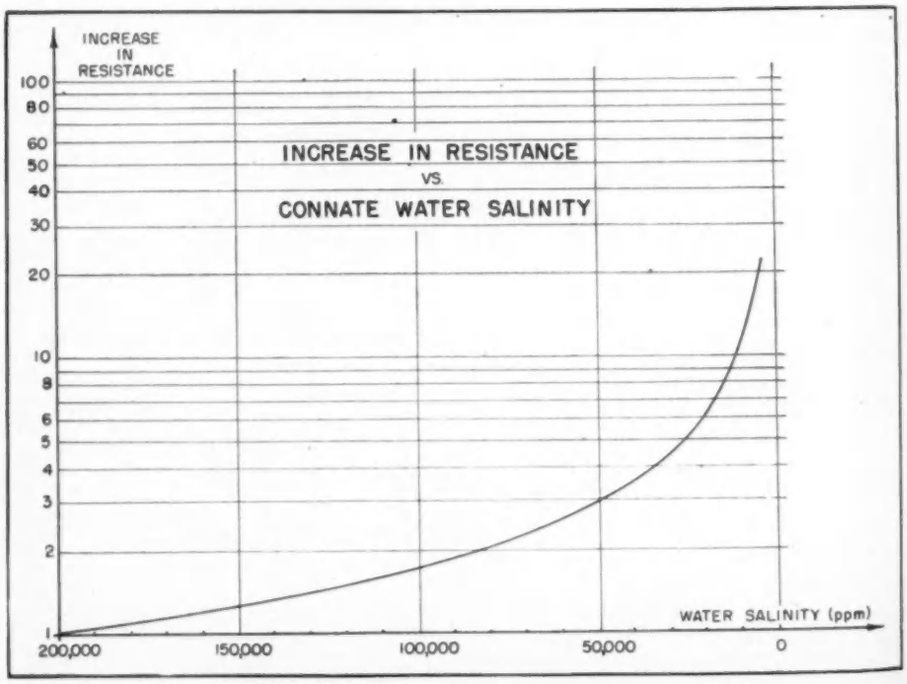
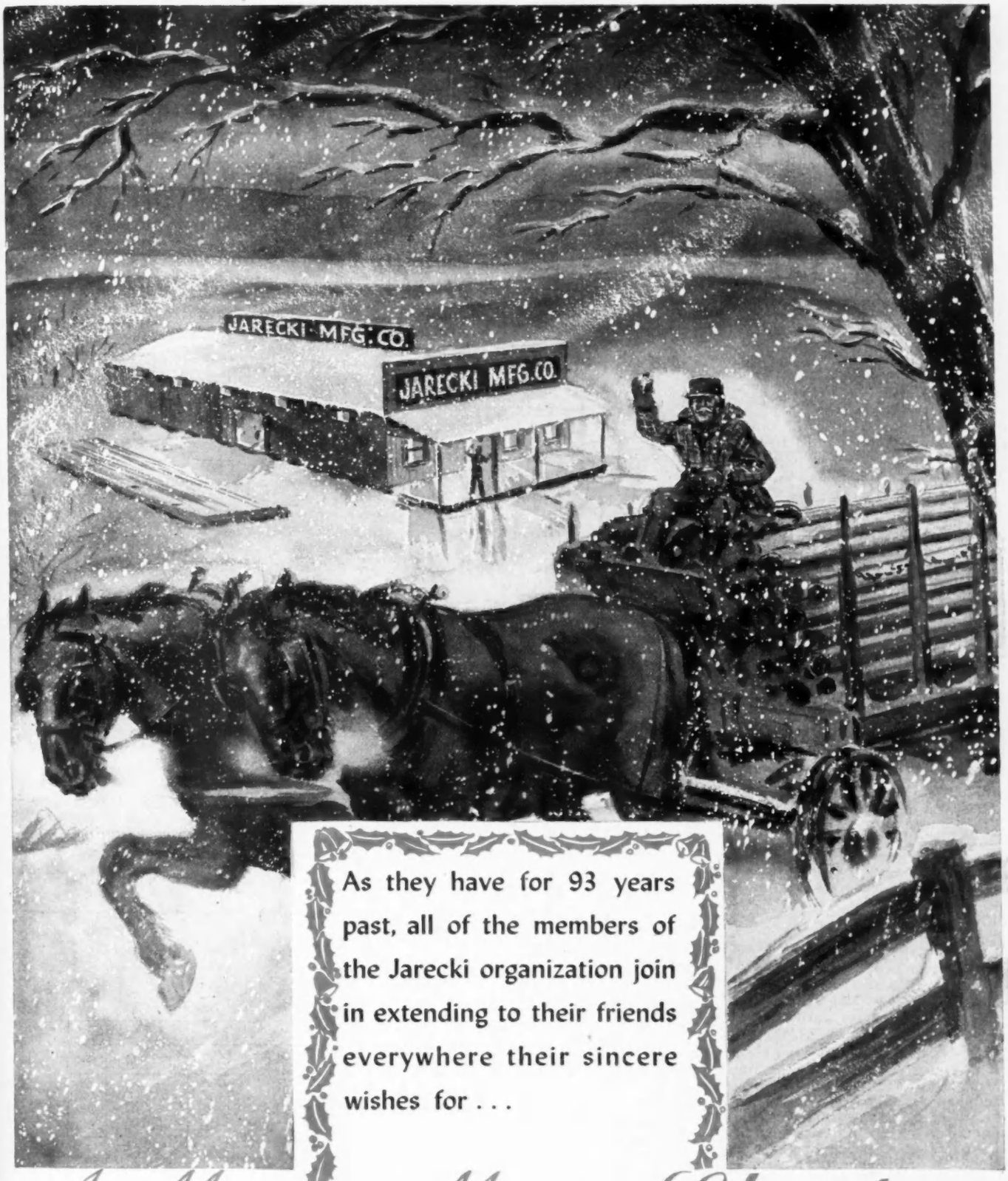


Figure 4. Resistance changes in terms of interstitial water salinity.



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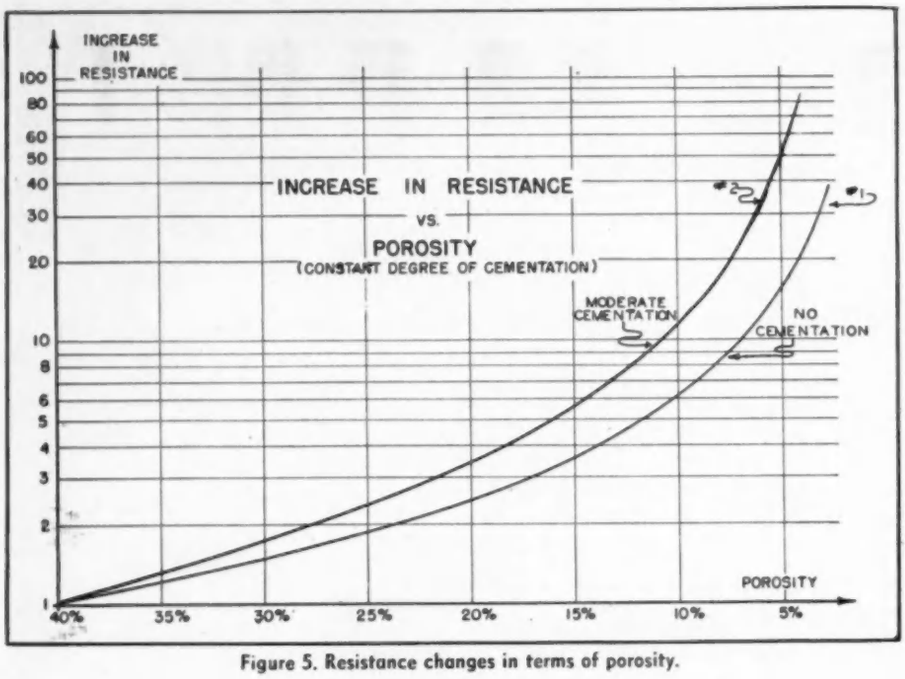

Figure 5. Resistance changes in terms of porosity.

petroleum saturation. This can be expressed analytically by rewriting equation (1) as follows:

$$S = 1 - \sqrt{\frac{R_w}{\rho P^m}} \qquad (2)$$

It is rather inconvenient to use this equation to estimate the saturation of a sand, and it has been found more practical to use charts permitting a graphical solution of the problem. The charts of Figures 3 through 6 could answer the purpose. However, it is simpler to condense them into two new charts, as shown on Figure 7. The chart to the left embodies the influence of the reservoir alone, namely, porosity and cementation. The chart of the right gives the influence of the reservoir fluids, namely, interstitial water salinity and petroleum saturation.

These two charts have been established by considering a particular sand whose resistance is used as a reference point. This sand has the following characteristics:

Porosity: 40% (P=0.4)
Cementation: None (m=1.3)
Interstitial water salinity: 200,000 ppm (R_w=0.03 ohm-m@130° F.)
Petroleum saturation none: (S=0)

The resistivity of this sand—computed from equation (1)—is exactly 1/10 of 1 ohm-m. It probably is the lowest resistance which the usual formations found in petroleum provinces can have. In practice, all media have characteristics which are different from those listed above. Because of these divergences, the resistance of these media is greater than 1/10 of 1 ohm, and the charts of Figure 7 allow to find out quickly whether part, or all, of this resistance increase is due to petroleum saturation. How this is done will be explained by discussing the logs of Figures 1 and 2.

Disregarding the resistant cap of the thick sands shown on Figure 1, it can be seen that the sand resistivity is about 1.4 ohm-m (value obtained from dash line curve made with a long three-electrode spacing: no correction necessary). This figure, 1.4, is 14 times greater than the reference resistance, 0.1, and the reasons for this have to be found.

From side wall samples it was found that sand A, whose log is shown to the left of Figure 1, has a porosity of 31 percent and that it is not cemented, i.e., the corresponding cementation factor equals 1.3.

Referring to Chart 1 of Figure 7, these characteristics give point M situated on curve 1.3 and whose abscissa is 31 percent. The ordinate of M, 1.4, gives the portion of resistance increase due to the reservoir itself. The residual resistance increase—obtained by dividing the total increase, 14, by the increase due to the reservoir, 1.4—equals ten, and it must be accounted for fully by the fluids—oil, gas and/or water—contained in the sand.

From samples obtained in neighboring wells, it is estimated that the interstitial water of sand A contains about 90,000 ppm. Referring to Chart 2 of Figure 7, the point N situated on curve 90,000 and whose ordinate equals the residual increase, i.e., ten, is marked. The abscissa of this point, 62 percent, is the petroleum saturation of sand A. Whether this saturation is oil or gas is impossible to tell from electrical data.

The same procedure will be used now to analyze sand B, whose log is shown to the right of Figure 1.

The true resistivity of this sand (neglecting the hard cap) is 1.4 ohms, i.e., 14 times more resistant than the reference point. Then the total increase equals 14.

The characteristics of this sand are:
very slight cementation (m=1.4)
porosity: 18 percent.

This gives point R (on Chart 1) whose ordinate, 3.3, represents the resistance increase due to the reservoir itself. The residual increase is:

$$\frac{14}{3.3} = 4.2$$

The interstitial water salinity of this sand is known to approximate 38,000 ppm. Referring to Chart 2, point S, situated on curve 38,000 and whose ordinate is 4.2, is marked. The abscissa of this point, 10 percent, gives the saturation of sand B. Actually, it is likely that the sand carries only water and that the small saturation value found is caused by unavoidable errors introduced by the inaccuracy of the numerical values of the sand characteristics.

Similar interpretation of the logs of Figure 2 is summarized in Table 1. Data is given only for the bottom sand of each section. Their true resistivity is obtained from the dash line curve (two-electrode, six-foot spacing: no correction necessary). It averages about 8 ohm-m. This value is assumed to be representative of the whole section. Bed C is an oil sand, while bed D is a sandstone carrying only water.

Interpretation of the logs of Figure 1

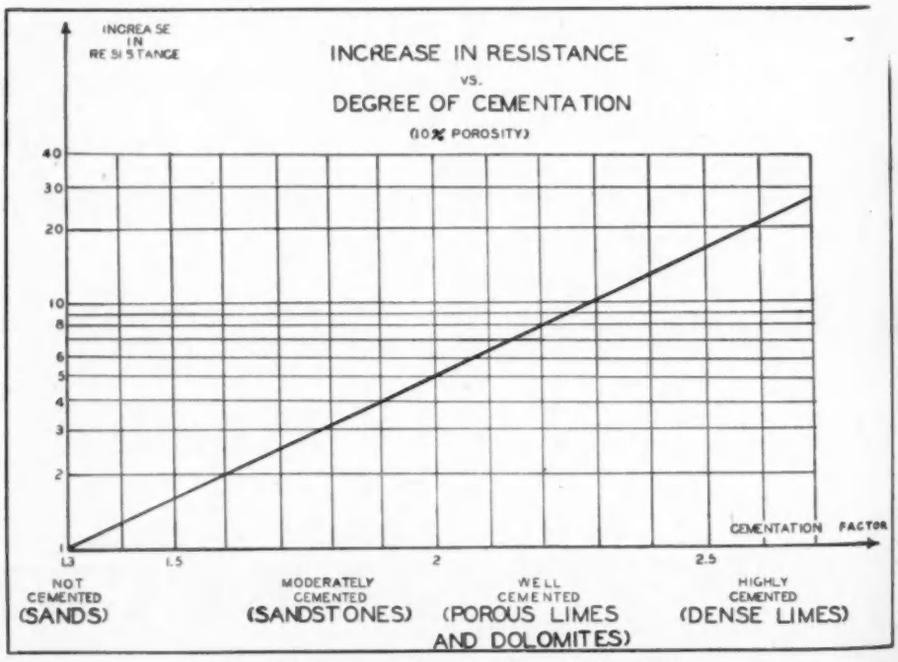

Figure 6. Resistance changes in terms of cementation.

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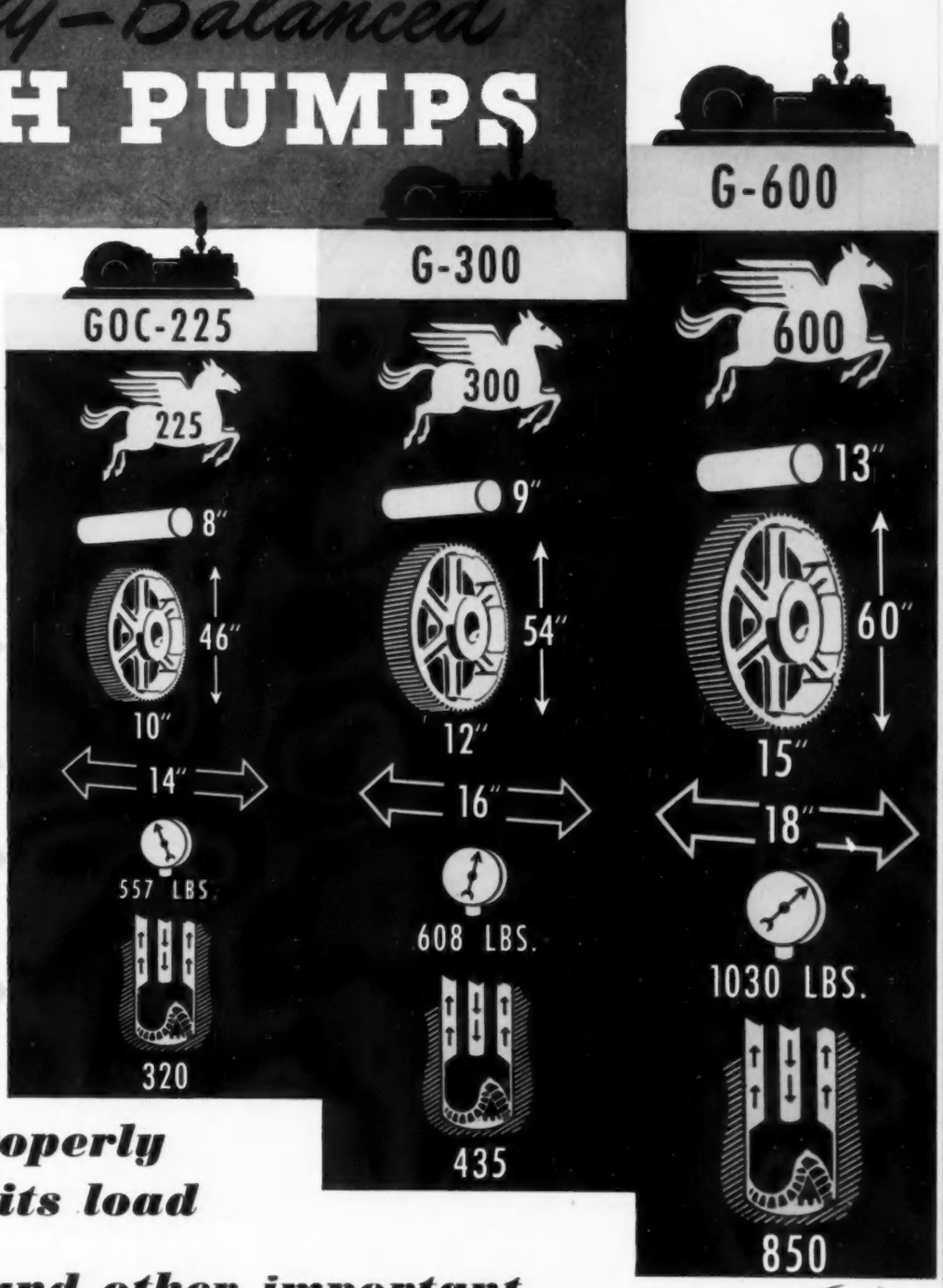

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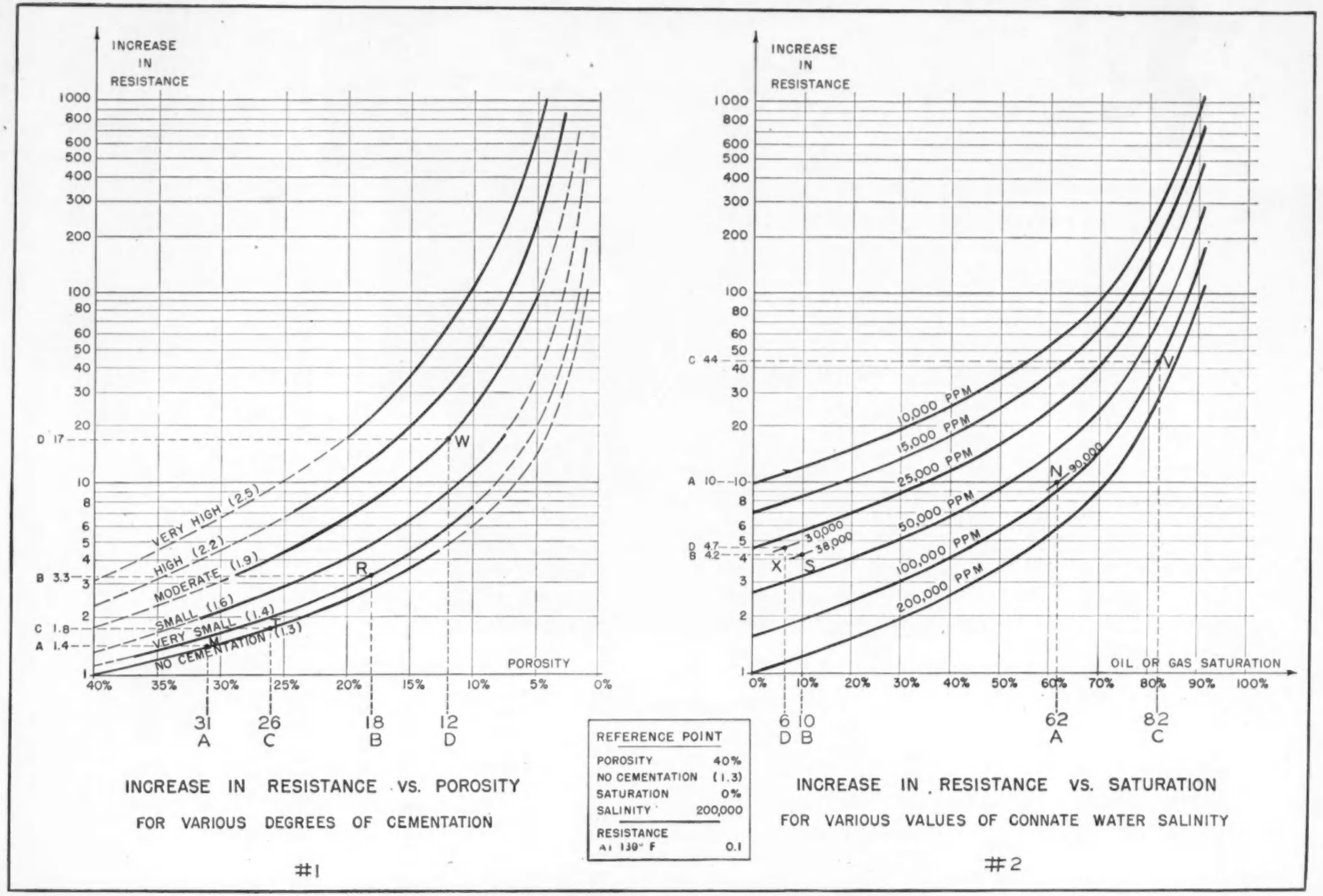

Figure 7. Charts for the estimation of petroleum saturation from resistance data

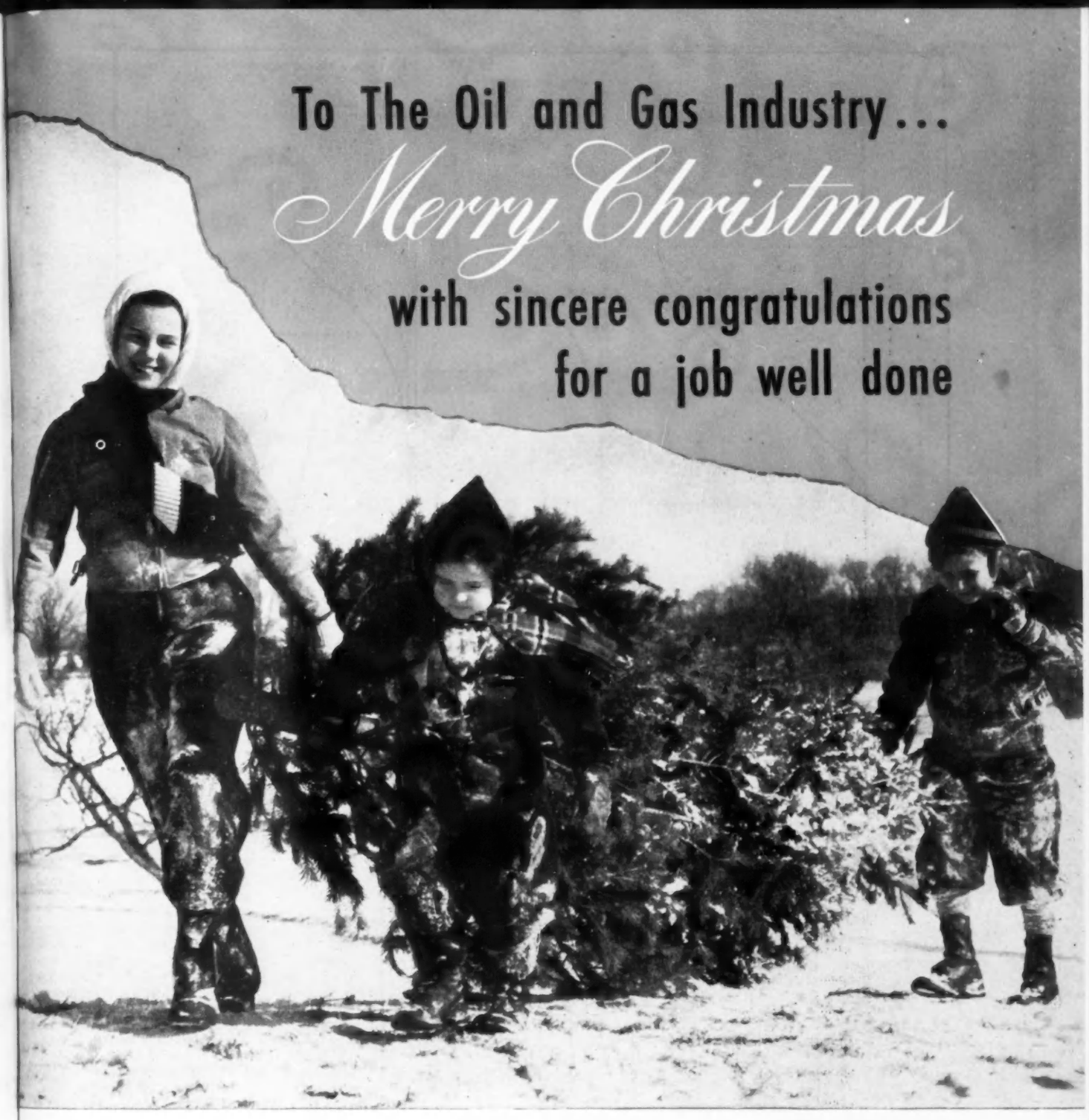

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Figure 7. Charts for the estimation of petroleum saturation from resistance data

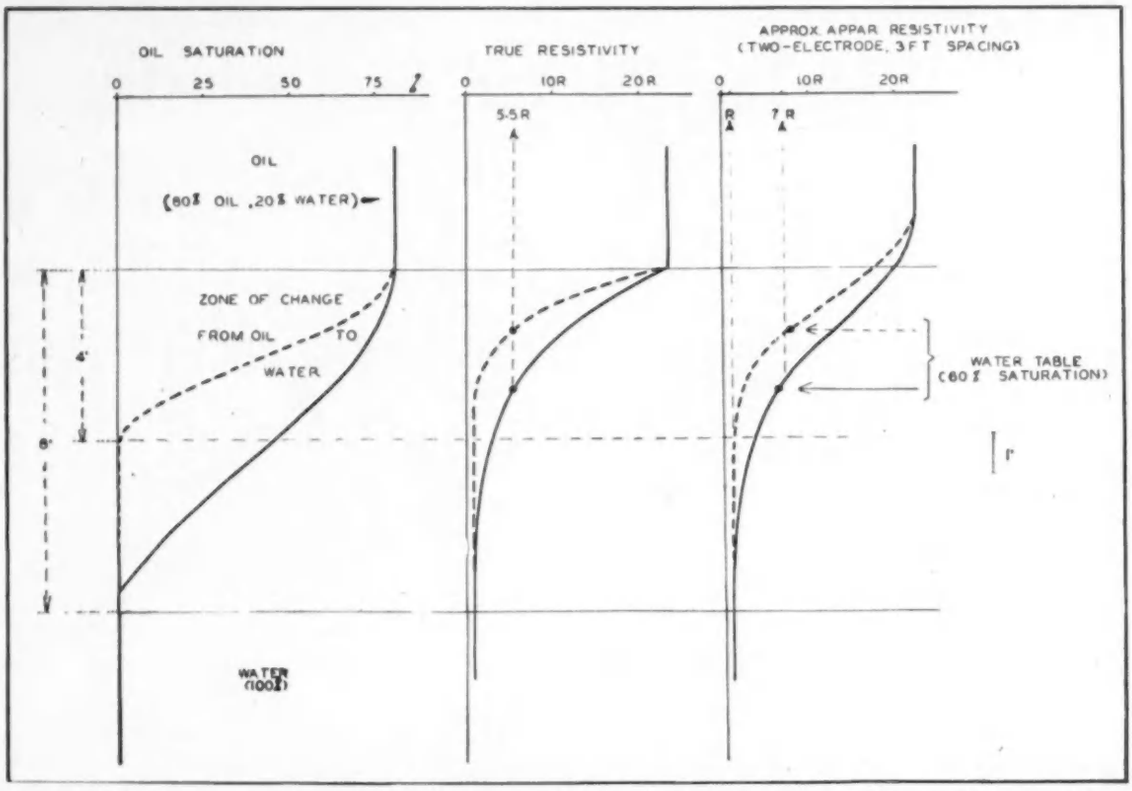

Figure 8. Resistivity curve near the water table (Saturation data from "Joint Progress Report on Reservoir Efficiency and Well Spacing," Standard Oil Development Company).

is also given in the table for convenience.

The use of the charts of Figure 7 can be summarized as follows:

(1). Determine true resistivity.

(2). Multiply true resistivity by temperature factor, if necessary, as explained later in section titled "Temperature Correction".

(3). Multiply result by 10, to obtain total increase T.

(4). Determine from Chart 1 the increase R due to reservoir. Divide T by R to obtain increase F due to fluids.

(5). Use Chart 2 to determine petroleum saturation from F and from interstitial water salinity.

The foregoing operations seem rather involved. Actually, they are simple when the principle of the method is well understood.

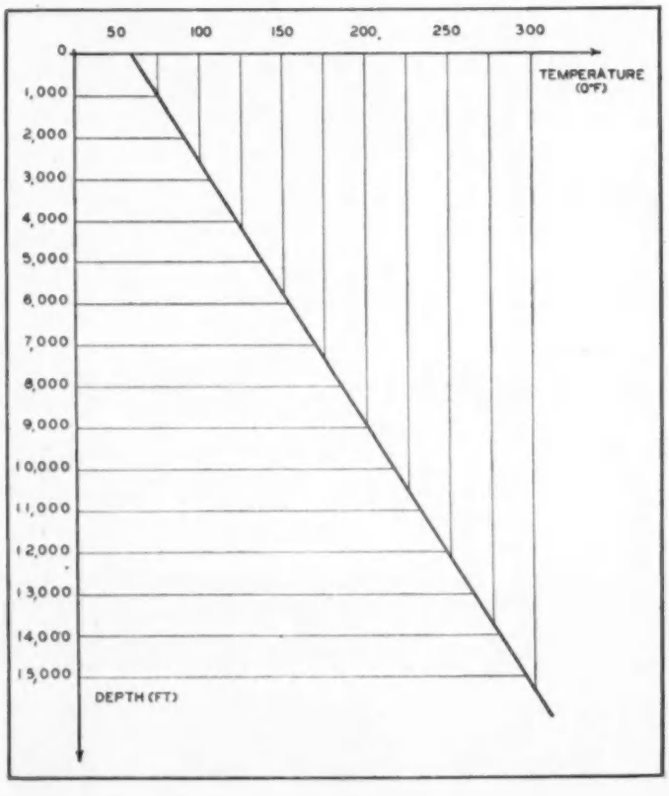

Figure 9. Aproximate ground temperature in the Gulf Coast.

Limitations of the Method

When the porosity, cementation, water salinity and true resistivity of a reservoir are known reasonably well, the method of interpretation outlined above yields very good results. When some of these factors are not well known, good qualitative information can nevertheless be frequently obtained because in many cases the influence of these factors is not critical, as has been pointed out previously. For example, in recent formations, such as those of the Gulf Coast, sands are usually not cemented and their porosity averages 25 percent. If no samples are available, but if it is known that a particular sand drilled normally, no large error will be made by assuming that the resistance increase due to the reservoir alone equals 2. Furthermore, the water salinity usually exceeds 50,000 ppm east of Victoria County. This figure corresponds to a residual increase of less than five where the saturation is less than 30 percent, and to an increase of more than 15 for saturations greater than 63 percent. The total resistance increases are, therefore, about ten and 30, corresponding to resistivities of one and 3 ohm-m., respectively. If the electric log shows that the sand resistivity is less than one ohm, there is a high probability that there is no commercial saturation, while there is a good possibility of commercial saturation if the sand resistivity equals 3 ohms, or more.

When only one or two of the pertinent factors are unknown, instead of all three, it is evidently possible to narrow the interval of indeterminateness, and therefore improve the interpretation.

If no data, even approximate, are available on the characteristics of the beds under investigation, as is frequently the case of the formations penetrated by exploratory wells drilled in new territories, it is usually impossible to draw

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WE at New Deal Specialty Company desire to add our own sincere wish for A Merry Christmas and A Happy New Year to our friends and customers and their employees in every oil producing country in the world—to men on drilling wells, on pumping wells, on pipe lines, in refineries, company shops and warehouses. We deeply appreciate your confidence and pledge anew our continued effort to serve you the best we know how.

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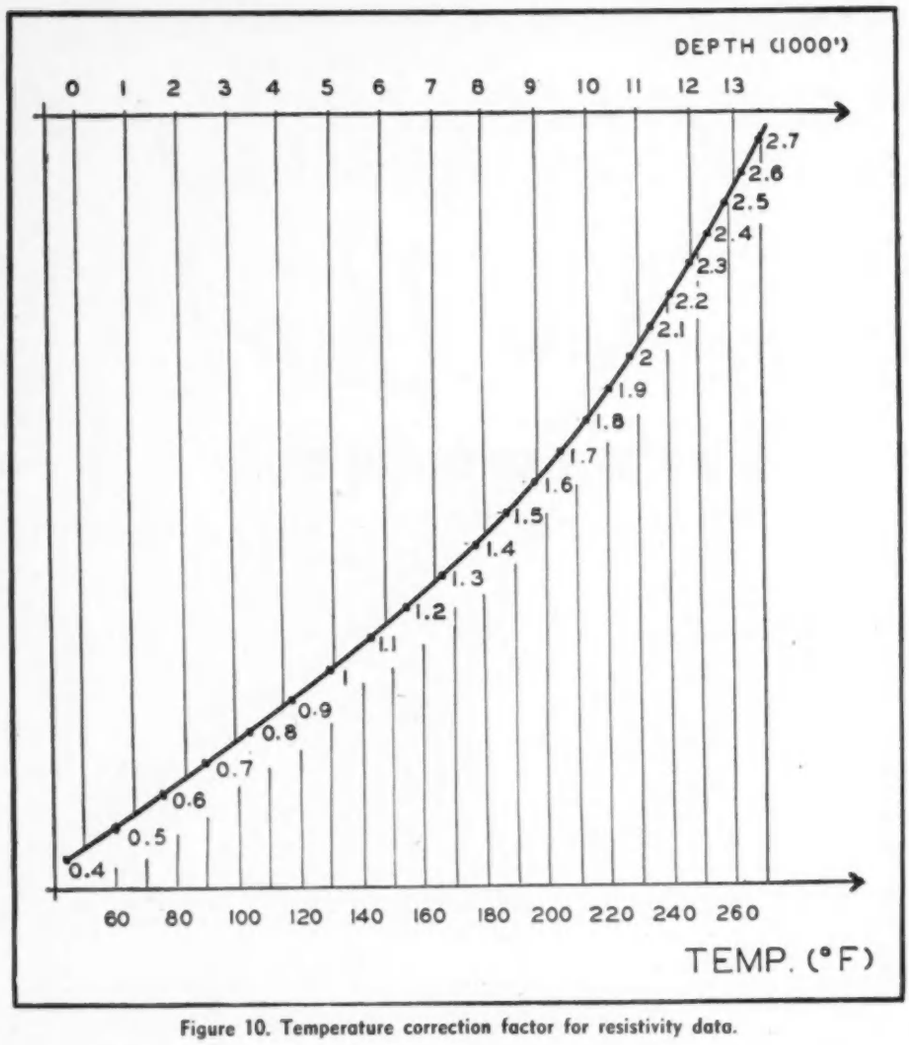

Figure 10. Temperature correction factor for resistivity data.

any definite conclusion from the electric log; any permeable medium whose resistivity is greater than ½ of one ohm-m. may have a commercial saturation, but the probability for actually having such saturation is evidently much less for sands of low resistance than for those of high resistance. In such unprospected areas, the nature of the fluids contained in each reservoir must be determined by more expensive methods, such as coring, formation testing, etc., and an electric log is usually more useful to direct these operations than to give itself the desired information on the fluids.

Use of a Sample

When a representative sample of sufficient size is available (at least one cubic inch) it is usually possible to determine the effect of the porosity and of the cementation by making an electric test. This procedure eliminates two of the three unknown factors and improves considerably the interpretation of the log. The sample need not necessarily be cut in the well under investigation: it may come from a neighboring well provided lateral sedimentation changes are small.

This method has already been described in detail[1], and will not be discussed in this article.

Use of Water Sand Data

Log interpretation is considerably simplified when one knows the resistance of the object sand when it is entirely saturated with its interstital water. In this case, the value of this resistance, R, can be used as a convenient reference point for estimating the petroleum saturation of the same sand when it contains oil or gas.

If ρ designates the resistance of the latter (given by the electrical log and corrected, if necessary) the relation between $\frac{\rho}{R}$ and saturation is shown on Figure 3 which gives the saturation by simple inspection.

There are two main cases when the value of R is available. One is when conditions are such that the sand under investigation is drilled several feet below the oil-water contact. In such case, the log gives also the exact position of the water table, as explained below.

Because there is no sharp line of demarcation between oil and water, a resistance curve shows a gradual decrease extending over several feet in height, as shown by Figure 8, where two different conditions are illustrated. For one of them—plain line curves—the zone of gradual change extends on eight feet (typical height of zone of change) while in the other—dash lines—it is of only four feet.

The maximum oil saturation of the section has been assumed to be 80 percent. For different saturation values the top part of the resistance curves would be changed, but the bottom sections would not be appreciably modified.

In practice, the water table corresponds to the point where the oil saturation is about 60 percent. At this point the apparent resistivity is approximately seven times greater than R, the resistance of the water zone. When determining accurately the water table from an electric log it is advisable to select this particular point (where the apparent resistance is seven times greater than that of the water section), rather than taking into consideration the actual shape of the curve or the maximum resistance value, because the latter are not easily correlatable with the 60 percent saturation point.

It should be noted that the vertical scale of Figure 8 has been appreciably amplified to give detail, and that a commercial log usually shows much steeper slopes.

When the sand under investigation is not drilled below the water table, the value of the reference resistance R mentioned above can be sometimes obtained from neighboring wells. This procedure, however, requires that changes in water composition and sand texture between wells are negligible.

Because of its simplicity and reliability, the method of interpretation outlined above is being widely used by petroleum geologists.

Temperature Correction

When good accuracy is desired, in particular when quantitative saturation data are needed, it is usually necessary to take into account the effect of temperature. This effect is greater than is usually realized.

Assuming an average temperature gradient of 64 feet per degree, and a surface temperature of 60, the probable temperature in terms of depth is as shown in Figure 9. From 5000 to 11,000 feet the temperature increases approximately from 130° F. to 230° F., and this results in a 50 percent decrease in resistivity, a figure which is not negligible.

Inasmuch as the charts of Figure 7 were established for a temperature of 130° F., it is necessary to make a correction when the temperature is different from this value. This is done by multiplying the true resistivity by a correction factor before using the charts. This temperature factor is given on Figure 10 in terms of temperature and also in terms of depth (assuming that the data of Figure 9 are reasonably correct and applicable to wells being drilled).

Usually the correction has to be made also when the saturation is computed from equation (2) or when an electric test is made on samples. On the other hand, when the procedure outlined in the preceding section is used (use of water sand data) the correction should not be made.

Conclusion

Every petroleum geologist is asking for a correct and simple method for interpreting electric logs. This desire can be only partly fulfilled at present; the method available is sound, but its application is somewhat tedious. However, when it is remembered how much effort and money is necessary for the drilling of a well, it will be appreciated that the spending of a few hours on the study of an electric log is certainly not out of proportion with the total investment.

REFERENCE

[1] Hubert Guyod, "Electrical Well Logging. Electrical Properties of Oil-Bearing Reservoirs," The Oil Weekly, November 13, 1944.

Greetings of the Season

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Patent Roundup

A Regular Feature of THE OIL WEEKLY

In this column will be reviewed patents dealing with drilling, producing and pipe line branches of the oil industry as they are issued by the United States Patent Office.

Patents recently issued by the United States Patent office at Richmond, Va., include the following:

Grab Device

A grab device for boring wells has been patented by Pierre Jean-Marie Theodore Aallard of Chantilly, France, with the patent rights vested in the Alien Property Custodian. (No. 2,390,-047.)

A number of scoops are mounted pivotally on the bottom part of a cylinder and are adapted to swing out to bite against the well wall. In the upper part of the cylinder are a number of "guide members," made of flexible metal bowed, and fastened to the cylinder. They serve to guide the descent of the device into the well.

Cementing Device

A well cementing device has been patented by Edgar W. McGaffey of Bakersfield, Calif. Forty-five percent of the patent has been assigned to Claude C. Taylor of Long Beach, and 10 percent to D. W. Ward of Huntington Park, Calif. (No. 2,390,112.)

A tubing contains a pair of spaced tubes both of which extend below the tubing into the well. A slip mechanism on the outer tube controls the flow of cement.

Pumping System

An improved system for pumping wells has been patented by James F. Ross of Laredo. The patent is unassigned. (No. 2,390,124.)

The system, which is designed to control hydraulic pump jacks, calls for a hydraulically operable reversing valve to be connected to the jacks to control the inlet and outlet of oil. It also regulates the up and down strokes of the pump jack. A pilot valve, also operated hydraulically, is connected to the reversible valve to control the flow of liquid which in turn actuates the reversible valve. An hydraulic power plunger, controlled by the pilot valve, supplies the supplemental liquid.

Logging Device

A well logging device which records the drilling rate of a well has been patented by Homer M. Rutherford of Centralia, Ill. The patent is unassigned. (No. 2,390,178.)

The rate is recorded on a strip of paper by an electrical device which snaps the pen back across the paper much the same as an electrical typewriter operates.

Seismic Survey Method

An improved method of seismic surveying has been assigned to the Stanolind Oil and Gas Company by Joseph A. Sharpe of Tulsa. (No. 2,390,187.)

The apparatus is designed to generate seismic waves which are recorded by means of a number of electric seismometers each of which is responsible only to the "simultaneous rotational effect of the horizontal and vertical components of transverse waves." the output of the seismometers is recorded as "a function of time."

Surface Prospecting

Phillips Petroleum Company has been assigned a patent for a new method of surface prospecting by Raymond G. Piety of Bartlesville, Okla. (No. 2,390,-270.)

A number of stations, established at spaced intervals above the earth, supply a constant low frequency alternating electric current to a fixed current electrode at a distance from the stations "at least 20 times the distance" between the stations themselves.

The current also is set up between the adjacent stations. The "potential" at each station then is measured in relation to the current electrode.

Derrick Structure

A new type of derrick structure has been patented by two Tulsa men, Wayland B. Woody and Merle G. Scott. It has been assigned to Franks Manufacturing Corporation, also of Tulsa. (No. 2,390,284.)

A platform is built at the side of the derrick and is designed so it can be swung horizontally or vertically or can be pulled up and down the side of the derrick by means of attached rollers.

Seismic Surveying

Another method of seismic surveying has been patented by Josephus O. Parr and assigned to Olive S. Petty, both of San Antonio. (No. 2,390,322.)

A seismometer converts incoming seismic energy into electrical wave signals which are amplified and recorded by means of a "thermionic valve."

The internal resistance of one of the valves is changed in response to a variation in amplitude of the signals in such a way as "to maintain the major portion of the record within usable amplitude limits."

Directional Pickup

Robert J. Roberts of Houston has assigned his patent for a directional seismograph pickup to Standard Oil Development Company. (No. 2,390,328.)

A support is suspended within a chamber which is designed in such a way that it produces a number of magnetic fields. One field has a vertical direction of departure, while the remaining fields have a horizontal direction of departure.

The direction departure of each field makes an angle with the direction of the other fields. A number of pickup coils, mounted on the support in the chamber, are adjacent to each of the magnetic fields.

Electrical Logging

Schlumberger Well Surveying Corporation has been assigned a patent for a method of electrical logging by Charles B. Aiken of North Plainfield, New Jersey. (No. 2,390,409.)

A pair of spaced-apart electrodes within the bore hole are connected to an electrical network to form an "impedance bridge" of which the electrodes and the intervening formation form one arm. High and low frequency sources, meanwhile, are placed at the earth's surface.

An electrical current is connected to the frequencies and the "bridge" and supplies high and low frequency currents "to the energizing diagonal" of the low current. An electrical current connects the outputs to an indicator at the surface of the earth.

Well Survey Apparatus

A method and apparatus for surveying a well has been patented by Robert Earl Fearon of Tulsa and assigned to Well Surveys, Inc., also of Tulsa. (No. 2,390,433.)

The adjacent strata of a well bore is bombarded with neutrons. At the same time and at "substantially" the same level, the gamma rays and neutrons returning to the well bore from the strata are measured.

The depth at which the measurement is taken is determined and recorded in correlation.

Drill Stem Performance Study Making Progress

Good progress is being made in the collection of data that will be used by Battelle Memorial Institute in its study of drill stem performance, according to the American Association of Oilwell Drilling Contractors. The Association entered into an agreement with the Institute, recently, whereby the Institute is to carry on research investigations on factors influencing the life of the drilling string, such program to continue one year and to be financed by voluntary contributions from sustaining members of the contractor's organization.

H. M. Banta, Battelle's engineer, recently spent five weeks in the Permian Basin, and while there gathered considerable material. He subsequently visited Houston to observe certain phases of fatigue-testing practices, after which he returned to headquarters at Columbus, Ohio. He later visited mills manufacturing drill pipe, studying the problem and its relationship to mill practice.

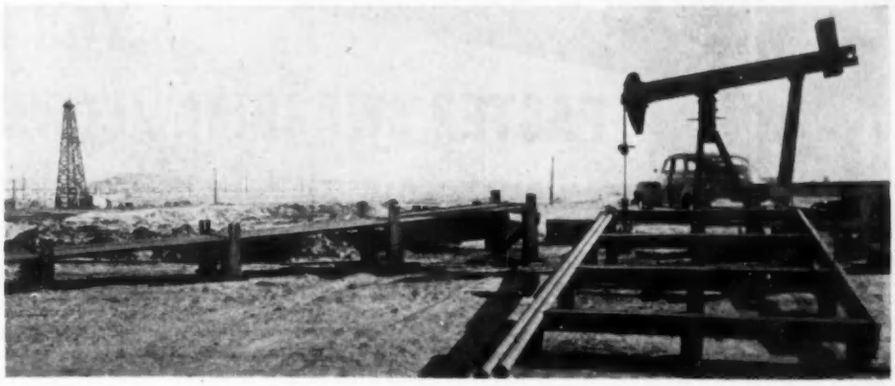
R. C. McMaster and Banta are preparing a progress report to be presented to the Association.

"Mother Hubbard" Hearing Is Scheduled February 28

The Department of Justice moved last week to revive its pre-war "Mother Hubbard" antitrust suit against the API and the major part of the oil industry, filing a motion in the District of Columbia court asking that a date be specified for the filing of an answer to the original complaint by the defendants. The motion was set for hearing next February 28.

Well Pulling Costs Cut By Time-Saving Rack

CANCELLING out some of the savings resulting from the practice of removing the derricks from pumping wells are the added expense and trouble connected with laying down tubing and rods each time a well is pulled. One company has devised a means of cutting down these additional pulling expenses by building standardized racks which greatly speed up the pulling job. Two racks, one for tubing and the other for rods, are installed at each well. Each is designed for a specific purpose and they are so arranged about the well head that a minimum of wasted motion is expended by workmen laying down or picking up joints.



The tubing rack was provided with ample width in order to eliminate necessity of having to stack tubing more than several layers high. At the driveway side of each cross-member of the rack, notches were cut in the timbers, these being wide enough to accommodate two joints of tubing lying side by side. When tubing is being run back into the hole, the rack man sees to it that two joints always are in this groove as is shown in the photograph. In picking up a joint with the elevators it is first rolled over onto the two joints in the groove. At least two advantages result from this practice. First, each joint is pulled up evenly without having to be tailed in, the end following along nicely in the smooth groove between the two permanently-laid joints. Free of rough areas as well as dirt and splinters, this method of providing a clean guide is both inexpensive and free of any need of mechanical guide or dolly device.

Time Saver

Second important advantage is the time saved at the well head where the man operating the elevators can step over to the very same spot each time for latching on to the joint. Similar savings are possible when tubing is pulled from the well; each joint, on being started in the groove, tends to slide down largely by its own weight until it is free of the elevators, at which time the rack man can grasp the joint and roll it over onto the rack. Depth of the notches cut in the ends of the rack members is exactly equal to the outside diameter of the tubing used in the particular well, permitting joints to be rolled across the groove quickly and easily.

The sucker rod rack employs a slightly different system of racking. While each rod or stand of rods has to be tailed out due to its limber nature, a means is provided for easy sorting and segregation. Like the tubing rack, this also is tilted for good drainage. It is floored with longitudinal planking in order to lend additional support to the rods. Nailed in a vertical position to the side of each cross member supporting the rack are 2x12-inch planks, each having at its upper end a long one-inch vertical slot. Short sections of sucker rod some eight to 12 inches longer than the net width of the rack bed are laid across the rack in these slots. As each row of rods is laid down, a set of these sucker rod spacers is laid in the slots. Separating the layers by this amount aids materially in allowing the sucker rods to drain, simplifies inspection, and at the same time keeps the box ends segregated so as to facilitate clamping on the elevators as rods are run back into the hole.

Spotting Important

In addition to the convenience of the racks themselves, the manner of spotting them at the well also is of prime importance in cutting down lost motion for the service crew members. Including the pumping unit assembly which extends back for some 20-odd feet, each installation shown radiates outward like spokes of a wheel around the one side of the well. The well ends of the racks come up to within eight to ten feet of the tubing head, which leaves ample room for unhampered movement of the men about the well, yet reduces to a minimum the number of steps necessary in racking the joints. Ample space is provided between the units to allow a truck to move in and unload beside the racks. The other side of the well is left uncluttered by equipment for the convenience of the mast and pulling unit when it is moved in. The entire setup requires only a small percentage of the amount of material normally required in conventional wooden racks, but this amount plus well engineered spacing at the well head, contributes to the cutting of production expenses every time the well is pulled.

German-Jap Equipment to Be Used in Research by Bureau

The Bureau of Mines will be the operator, but not the owner, of the Missouri Ordnance Works at Louisiana, Missouri, which it recently announced would be used as the demonstration plant for the production of liquid fuels from coal.

The bureau announced December 13, that to save time in conducting the research program, it will bring to this country "several thousand" tons of equipment and supplies from captured German and Japanese synthetic fuel plants and laboratories.

The Navy Department will aid in obtaining hydrogenation and oil-refining pilot plant units which were found intact at a Japanese naval installation, and requests have been made to the War and State Departments for similar assistance in obtaining German equipment, of which a limited amount is available in the American zone.

Reports indicate that Russia also is interested in synthetic liquid fuels, even though its natural petroleum reserves are virtually untouched when compared with our own intensively-developed oil fields.

Tass, the official news agency of the USSR, recently announced the start of construction on two synthetic fuel plants, one of which is designed to yield 500,000 metric tons of liquid fuels annually, a development, bureau officials commented, which alone dwarfs the five-year research and development program authorized by Congress for the interior Department.

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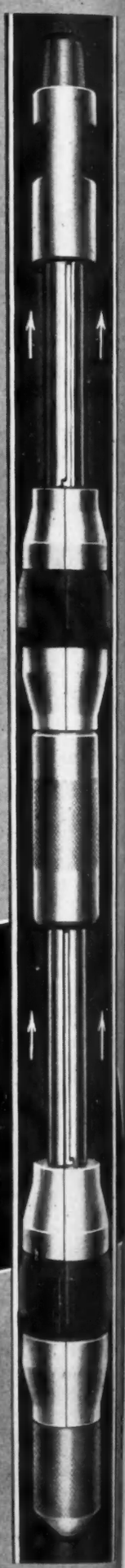

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Shop-Made Grinder

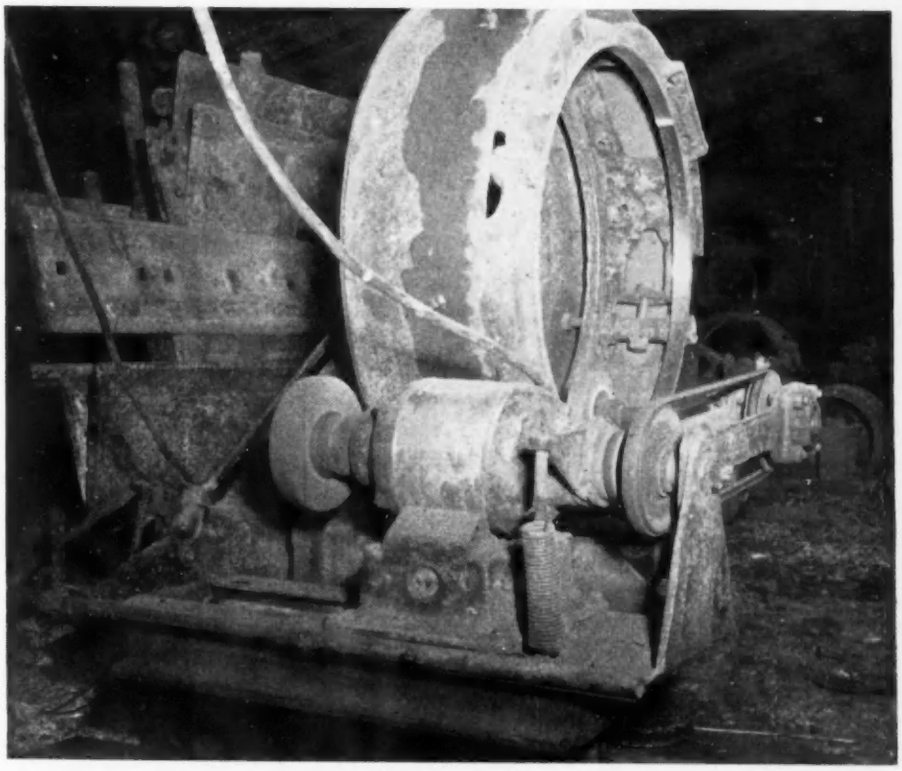
Regrinds Pipe Cleaning Machine Bearing Surfaces

By HARRY A. HESS, Staff Writer

ON PIPE cleaning machines where the cleaning brushes revolve around the pipe, it is necessary to replace frequently the band that holds the brushes. One contractor devised a means of hard surfacing the faces of these bands and then grinding them down by means of the device shown in the photographs.

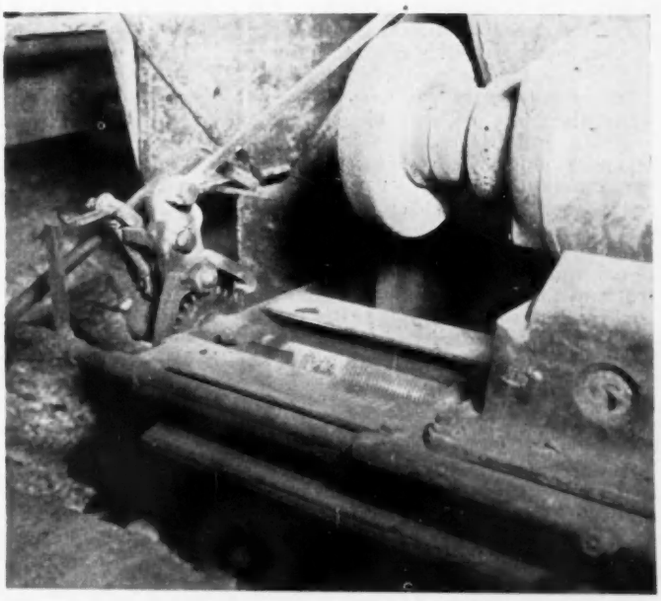
Two ½-horsepower electric motors are used to operate the grinding machine. One turns the grinding wheel and the other rotates the band and moves the grinder back and forth over the face of the band. The band is clamped inside a large ring as soon as the surfaces have been built up with hard metal, and set so that the weight of the grinding wheel is on the surface throughout the 360 degrees of rotation. The grinding motor and emery wheel assembly is then adjusted so it passes over the surface to be ground. A crank attached to the shaft of the bell holding the band operates a ratchet connected to a screw, causing the assembly to slide.

A unique arrangement of the ratchet and dog device causes the direction of travel to be reversed when the grinding wheel has passed over the surface of the band. Only one side of the band is ground at a time, and the motors run unattended for hours at a time until the metal is ground to the proper dimension.



The grinder at work on a bearing surface. A spring holds the correct pressure of the emery wheel against the metal. A regular grinding motor was used, the emery wheel on one side being replaced with a V-belt sheave. The emery wheel on the other side serves no function in this operation.

View of the back of the grinder, showing the motor that turns the band and also operates the ratchet which moves the grinding wheel back and forth over the surface to be ground.



Close-up of the ratchet and screw which moves the wheel over the surface of the band. The upright bar contacts the arm attached to the dogs which throws the dogs in the reversing position.

The Natural Gas Act and the Oil and Gas Producer

By WALACE HAWKINS
Vice President and General Counsel,
Magnolia Petroleum Company, Dallas

ANY discussion of the oil and gas producer, the American oil and gas producing industry, and the Natural Gas Act should begin and end with one sentence—the Natural Gas Act of 1938 does not apply to the oil and gas producer and producing business. The American Congress minutely defined the scope of the Natural Gas Act and thereby brought under federal regulation for the first time two distinct types of interstate commerce, namely, the transportation of natural gas in interstate commerce and interstate sales of natural gas for resale. Lest there be doubt concerning what the act did apply to, it further stated what the act did not cover, namely, "the production or gathering of natural gas," matters which were neither transportation nor interstate commerce. The simple language used is as follows:

> "The provisions of this Act *shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale* for ultimate public consumption, for domestic, commercial, industrial, or any other use, and to natural gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas, or to the local distribution of natural gas, or to the facilities used for such distribution, or to the *production or gathering of natural gas.*"

At the time of this enactment, the regimen and habits of the natural gas business had hardened into recognizable forms and practices; the long absence of federal entry into the field had given the courts ample opportunity, and they had definitely defined that which was national and subject to uniformity of control and that which was local characterized by diversity. The judges had marked out the constitutional reach of the police and tax powers over the natural gas industry of the state of origin as well as the state of destination. Thus the Congress was able, with nicety of language, to pick out those restricted types of interstate commerce in natural gas which it desired to subject to federal regulation and Federal Power Commission control as well as to define those areas of the business, whether subject to constitutional control or not, which it did not desire to enter. The need for national regulation was so identified with such well-defined types of interstate commerce that the explicit words of delegation contained in the act did not include the customary power to regulate that which affected or was affected by interstate transportation and sale for resale; neither did Congress, in describing the power delegated to the Federal Power Commission, employ the trite phrase "and otherwise to effectuate the policies of this Act."

Opponents of national control of oil and gas production cannot now merely defend against threatened legislation

Neither the legislative history or purpose nor any uncertainty with respect to the adjudicated dimensions of the fissure arising from the regulatory incompetence of states can enlarge the scope of this legislation. To concede that Congress forbade the application of the Natural Gas Act to the oil and gas producing business and excluded the Federal Power Commission from any control or regulation of such producing and gathering business, and at the same time to assume that there is such regulation and control under the law and orders of the Federal Power Commission, must inevitably raise the question of authority and validity of such control.

In many states thousands of state officials and producers of oil and gas, big and little, are now as much concerned and are as earnestly anxious about federal administrative control, direct or indirect, partial or incomplete — by the yardstick method or otherwise—as they were in 1940 when, by the rejection of the Cole Bill, control of the business was defeated. Those who are against national control of the oil and gas producing business can no longer merely defend against threatened legislation. Administrative federal control as contradistinguished from legislative control makes this so. Usurped power may still be exercised by the Commission well within interstate commerce, and therefore the one who objects is deprived of constitutional protection. Hence the legal question usually is a mundane one—are the orders of the Commission within or beyond legislative power. The present judicial tendency is to permit the Federal Power Commission to push its powers to, if not beyond, legislative limits. Therefore, the true situation is, there being no constitutional protection and judicial relief against usurpation being unpredictable, that those who oppose the system can only be heard by becoming advocates and proponents of national legislation.

Sale for Resale

How many oil and gas leases and producers are now natural gas utilities or can be reasonably expected to become natural gas utilities? All producers who operate interstate transportation lines now know their leases are public utilities, dedicated to public use and clothed with public interest. That Congress might be willing to excuse disobedience to its orders on the ground that this is so only indirectly does not lessen the directness or certainty of the utility status of such leases and producers. It may be said that interstate gas pipe line companies having their own leases and production are few and the imposition of utility status on them is a small matter. This viewpoint overlooks another readily available method by which oil and gas leases and their operators may be brought within the fold as a natural gas utility.

An oil and gas producer guilty of making a sale of his gas for interstate resale may fasten the so-called indirect utility status on his lease and operations as firmly as the pipe line company has subjected its leases and production. Here again the oil and gas producer may plead that Congress forbade in plain language the application of the law to "production and gathering." His argument that the constitution protects and prevents the taking of private property without consent for public use may be but politely noticed. The Mexico incident illustrates.

It will be said that he voluntarily made the sale, innocently or otherwise; hence, he cannot complain that he has not dedicated his property to public use. Will his contention and insistence to the court that the Federal Power Commission, in thus impressing his property with utility status because he has made such a sale, have a favorable

An address before the Mineral Law Section of the American Bar Association, at Cincinnati, Ohio, December 18, 1945.

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CONTINENTAL

SERVING THE OIL AND GAS INDUSTRIES

chance of success? May it not be expected that he will be told again that the utility status of his lease results only by indirection; that a forced bookkeeping system imposed on him is but incidental and meaningless?

Whether a producer's sale for resale carries interstate guilt will not be determined by the Congress or by standards contained in a law if the present regime persists; it will not ordinarily be determined by the courts. The interstateness of a producer's sale for resale, it must be expected, will be largely determined as a fact by the statutory delegated expertness and discretion of the Federal Power Commission. The time is desperately near at hand when any realist must advise that whether an oil and gas lease or its producer who accidentally or purposely sells to an interstate purchaser is a public utility or not rests almost completely with the tender mercies of the Federal Power Commission.

Of course, the sale for resale which congress subjected to the Federal Power Commission's jurisdiction was in fact a wholesale sale of gas transported from the state of origin to a state of destination and there sold by a pipe line transporter to a known non-affiliated distribution company. This was the only sale in which the Congress was interested. It was the only sale theretofore adjudicated as free and immune from effective state regulation. It was a sale for resale which was an interstate wholesale sale. It was a sale made by an interstate pipe line transporter. It was a sale of gas transported from one state to another. It was a sale to a purchaser who was a local distribution company. The seller as well as the purchaser knew at the time of the sale that the gas was interstate gas which could only be used for distribution to consumers.

Producer's Sale

The producer's sale at the lease to a purchaser has practically none of these characteristics. In the first place it is not the sale of transported gas, either state or interstate. The gas at most is merely produced or gathered gas. The seller of the gas is not a transporter but a producer or gatherer. The sale is not a wholesale sale. The interstate pipe line purchaser may or may not transport the gas in interstate commerce. The gas may or may not be resold to an out-of-state distribution company for resale. The sale is an incident of production and not an event of transportation. Such sale is the terminal act of production and gathering; it is neither the initial act of transportation nor is it an element of regulated transportation.

The majority of the Commission on rehearing once professed that the producer's and gatherer's sale was without the jurisdiction of the Commission and that the Commission had no right to regulate and fix the price of such sale. It would not strait-jacket with accounting power. While that declaration by the majority has not been directly overruled, the minority's viewpoint has since been advocated, urged and judically recognized. The best evidence demonstrates that the Commission's power over sale for resale is being exploited carefully and erosively, but nevertheless gradually, and certainly subjecting more and more producers and oil and gas leases to commission accounting and other control as well as price regulation. I have indicated in the notes the indicia of this tendency. The statute does not define immunized gathering and production. It does not enumerate by types that transportation of natural gas subjected to regulation. Under ordinary administration, it was unnecessary. What transportation is within the scope of the Act and what is without again largely rests with the statutory expertness of a commission heretofore committed to a policy of pressing its jurisdiction to the very limits of and even beyond statutory permission. It may therefore be reasonably expected, assuming that present policy continues, that production and gathering, by so-called fact finding, will be cut down to the narrowest scope and area and that transportation will be broadened and enlarged to the utmost.

Hence, there is substance to the fear that all producers and gatherers, either because such producers operate a pipe line transmission company or because their sales are simulated as sales for resale, will be subjected to the jurisdiction and control of the Federal Power Commission. The fear that a utility status will be imposed on such leases by the Commission is so strong that even waste gas fails to go to interstate pipe lines.

Just Rates for Interstate Transportation and Sale

For some five years it has seemed to those who hold the producer's point of view and perspective that a national commission with traditional rate-making power over interstate transmission and sale of natural gas could not lawfully revolutionize the oil and gas producing business. Interstate natural gas transmission and sale for distribution has been indifferently sketched in as a minor detail with production and gathering as the dominating feature of the general oil and gas business. It is an entirely new scene to many of us where interstate natural gas transportation or sale is dramatized and is made to steal the whole show. Such is not an admissible view of the industry. The use of conventional rate-making power over the relative, minor, incidental business of interstate transportation of natural gas as an avenue to reach and dominate the center and heart of the oil and gas business is at least revolutionary. Has the Federal Power Commission so exercised its powers to make just and reasonable rates for interstate transportation and sale of natural gas in such a manner as to leave undisturbed "all other matters which were then subject to state regulation, which included rate-making for production and gathering?" The current investigation being made by the Commission implies at least that it has grave doubts of the adequacy and correctness of its previous orientation and perspective.

The Commission, in an ex parte hearing, without testimony and so far as is known without conducting a test, found and determined that its power to fix interstate transportation and gas rates was sterile because the Congress had immunized production and gathering. It did not elect to report its conclusion to Congress and ask for instructions. On the other hand, deeming itself to be *in extremis* on the ground of self-serving necessity, it swept aside the congressional obstacle and (1) boldy applied the very "key to effective regulation" to the producer and his producing and gathering properties. Having done this, it then (2) followed with *"these new and more expeditious methods of rate determination,"* notwithstanding it had been represented to Congress that such power was of the "standardized" kind and by no means "novel". Earnings, as contradistinguished from rate-making, were restricted by order to 6½ percent on a selected depreciated original cost basis. In fine, subjective administrative necessity made the law for production and gathering which Congress had plainly and deliberately declined to make.

Oil and gas leases and producers and the production of oil and gas were made public utilities in reality, regardless of the indirectness and subtlety of the method. The foundation of the utility status does not rest upon congressional mandates but upon administrative finding of necessity and vertical exploitation of the conventional rate-making power over a wholly different but related industry. This result, not visualized by the law-making body of the nation, coincidentally or otherwise, is the exact result recommended in January of 1939 by the National Resources Committee.

Regimental Control

Thus, administrative control of the managerial type regiments an oil and gas producer and oil and gas producing leases and measures earnings at 6½ percent of the depreciated cost of the leases and production. Chairman Manly stated that doubt as to the propriety of applying such regulatory principles to the producing business, "more erratic, irregular and unpredictable in relation to investment than any phase of other utility business," had been dissipated. Just when and where this was done does not appear. He believed that the application of the utility principle to the oil and gas producing business was "peculiarly necessary." As was to be expected, the application of the rule at once produced what Justice Jackson was pleased to describe as a fantastic delirium, namely, five leases having a sworn market value of $3 million were solemnly accepted at $4,244.24. It must be noted that not a single one of the digits is an odd number.

The reason and arguments why such regulatory devices and rule so peculiarly necessary is inept, inappropriate and unworkable have been variously stated. "Man cannot produce or reproduce a natural gas field"; more money is invested in non-producing than in producing property; more investment, not to mention effort, work and skill, fails to produce any gas than is invested or employed in gas producing properties; there is as much if not more costs, investments, and market value in oil and gas leases that never have and never will produce a cubic foot of gas than there is in producing leases; in an undertaking where the law of averages cannot be relied on, certainly an arithmetical percentage of costs for limiting earnings is an academic dream.

The oil and gas producer never has and never will write a reliable prospectus of investment and earnings in exploration or in wildcatting. Those who try that and use the mails are sent under national law to the federal penitentiary. An oil and gas producer has not and cannot limit his investment to a percentage of the value of that which he may find. There is no means or method for an oil and gas producer to limit his drilling costs, either of an exploratory or developmental type, to a

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percentage of the value of that which he expects to produce. Lifting costs, if they follow any general pattern, run contrariwise to production costs in any other business. The producer's earnings come from what is hidden in the ground and not from what he invests in the lease. No banker ever loaned money on such a cost principle. Measuring earnings by costs is like finding the length of a rope by the liquid measure table.

Valuation, book or otherwise, of leases and oil and gas production as a means for measuring return does not even have the virtue of an experiment. The Congress, the American industry, governmental officials, commissions and bureaus earnestly tried it barely more than a quarter of a century ago, utterly failed, and deliberately abandoned such a scheme. The literature on the subject is scarcely history. Congress and congressional policy for more than 28 years have been recognizing the hazards and risks peculiar to the oil and gas producing business. It has established and consistently maintained hazard-recognizing provisions in national legislation and has thereby produced a healthy flow of risk and re-risk capital into the treacherous business. Congressional policy is directly the opposite and reverse of Federal Power Commission policy. Congress disregards prospecting and drilling costs in measuring and determining return, whereas the Commission blandly undertakes to measure such return by a flat percentage of costs. Congress accepts production revenues with stated discounts as a means of measuring earnings, whereas the Commission disregards production revenues and uses original costs for such purposes. The Commission awards discovery value to the consumer. The congressional regulatory method, vindicated by 28 years of experience and two wars, has proved its validity and correctness and practicality.

Destructive Rule

Risk and re-risk investments restricted to 6½ percent return cannot be expected to find, produce, and make available either the discovered or the undiscovered natural gas of the country. Discovery value is the very life blood of the industry. The application of the rule in the long view with such results can neither be in the interest of investors in pipe lines nor the consumers. Such a rule may well destroy the ability of our nation to defend itself. The consumers are the preferred beneficiaries of the Commission regime. The application of the rule to production destroys rather than creates reserves. It tends to drive the oil producer to a deliberate election to waste gas rather than to conserve it. The hard logic to him is that it is cheaper to do so. Application of the principle has or will result in a bureau-created, artificial, competitive fuel problem.

But it is argued for marginal and semi-marginal, high-cost production properties, and integrated gas pipe line companies in non-competitive production areas that utility status with 6½ percent return is preferable to the normal return on non-utility property. It is proclaimed that the Commission's liberal scheme promises such producers all their costs back, full return of all dry-hole money, lush allowances measured by prodigal, statutory experts to permit risk and re-risk investments in exploration and production, and an assured return of 6½ percent; also, an ambiguous promise or warning of reduced return on transmission properties to the recalcitrant producer who fails to enjoy managerial regulation and control of producing properties.

In reply, it should be observed that such promises are not guarantees. Abandonment certificates are the sole tangible remedies of the Commission. Such a view is a short and local one. Such a policy may have justifiable and reasonable application under some local situations and phases of gas production for the protection of the consuming interest. It fails to meet the requirements of uniformity necessary to a national policy in the public interest. Production is too diverse for federal uniform control. Such a program entirely fails to take into account and recognize the admitted legitimate interests of the American oil and gas industry and the vast army of oil and gas adventurers whose ranks are perennially filled by planless recruits according to the unknown rules of accident. It fails to even touch oil and gas prospecting and producing under competitive conditions, but rather it creates a favorable climate for monopoly. The nation's need and demands for vast quantities of oil and gas cannot be safely rested upon such principle, the basis for which was once tried and found inadequate.

In any event, rates for interstate gas maintained at levels designed solely to recruit investors in interstate pipe lines and to furnish gas to the consumer at the cheapest price are of course not the just and reasonable rates required by the act. Interstate gas rates determined on such a policy are lacking in nationality. At least, it may be observed that the legitimate interest and welfare of the oil and gas producing industry and the multitudes who draw their living therefrom are admissible elements of any just and reasonable national rate-making policy.

Certificates of Public Convenience and Necessity and Uniform System of Accounts

Has the certificate power granted by the Natural Gas Act to the Federal Power Commission been employed within the "ambit of their statutory authority?" What is the impact, direct or indirect, of the use of this power upon oil and gas producers and production?

Again we find that administrative expertness and discretion must, to some extent, fill up and provide the content encompassed within the words "public convenience and necessity."

Business judgment and determinations, presumably made by men trained and experienced in the business, concerning matters of financial soundness and engineering feasibility as well as good business risks, are not merely reviewed but are managed by means of the "key to effective regulation"—the uniform accounts device. The fact that the pipe liner has taken the risk and may lose his money apparently adds neither weight nor credibility to his decisions, entitling them to preference over a salaried expert. It must be independently determined by statutory experts that the reserves are adequate. The expenditures must be investigated to determine whether they are legitimate and honest. The Commission, it is said, must somehow oversee the drilling, producing and operating practices from the pocketbook standpoint. Adequate depreciation and depletion must be forced upon an unwilling pipe liner. Money allowances must be determined by the Commission and doled out to the pipe liner with which to drill and conduct exploratory and development operations. The Commission must determine whether the gas is produced in accordance with standard practices of conservation ascertained by an unannounced agency. On the other end of the line, likewise immunized by Congress from control and regulation, the Commission has found that consumption may have to be restricted to the purposes and uses determined by it.

Oil and gas leases and producers having a natural gas utility status either because they engaged in interstate gas transmission business or because they have made, innocently or otherwise, a guilty interstate sale are thus subjected to the certificate and uniform accounts powers exercised by the Commission. These certificate and uniform accounts powers have been implemented by the Commission's regulations to such an extent that in large measure it has the business management of the oil and gas lease and the producer becomes a mere tools contractor.

The kind, use, amount and volume of oil and gas production, operating practices, well spacing, conservation practices, definition of fields, oil and gas ratios, engineering control of reserves, processing, handling, local markets and marketing regulations are matters within the traditional domain of state governments and regulatory bodies immunized by the Natural Gas Act. Congress, not by mere accident, sought to eliminate dual governmental control with its inevitable conflicts and frictions over such matters, either directly or indirectly. Immunization of production and gathering from federal control was deliberate and purposeful. Four years prior to the enactment of the Natural Gas Act and again one year almost to a day subsequent to its enactment, Congress, in lieu of entering into this field of regulation, deliberately synchronized interstate commerce regulation with state laws and regulations governing such matters. As to "petroleum," "constituent parts of petroleum," and "petroleum products," national policy required that interstate commerce regulation accommodate itself to state production regulation and restrictions governing volumes, uses, kinds, etc. This is obviously law for the regulated as well as the regulators. We should not expect this minute congressional regulation of interstate commerce to be modified, changed or added to by the Federal Power Commission in the exercise of its power to define public convenience and necessity. And of course there are other national laws fixing and determining national policy and regulation of interstate commerce in oil and gas. It might be observed here that these producing regulations, now effective rules for interstate commerce, are in the nature of restrictions and maximums.

From the producer's viewpoint it is inconceivable that an interstate pipe line purchaser of gas should be immune and insulated from the essential statutory obligations and regulatory duties inherent in his business as a gas purchaser. I refer to ratable-taking obligations and duties in respect to correlative rights in a single field, installations and extensions. Money for these purposes under

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the uniform accounts system is a matter of grace within the discretion and determination of the Commission. Is it enough that the Commission believes such expenditure unsound from the viewpoint of the investor or detrimental to the cheapest price to the consumer? Again here the matter of such expenditure ought to be viewed from the standpoint of the producing community and the obligations owed to that community by such purchaser. Who will build the compressor for gathering and saving waste gas—the producer who gets nothing out of it or the pipe line purchaser who at least gets 6½ percent on his investment? The consumer interest surely can be expected to stand the charge designed to prevent the waste of gas and to conserve natural resources.

It may be observed that the reported experience of the Commission to date in respect to certificates has largely centered around the relief of shortages in existing consuming areas and to supply war demands. Undoubtedly the exploitation of the certificate power of the Commission on a permanent basis is in the initial stages. Recently the Commission, in effect, told a Boone, Iowa, plant owner he could operate his plant successfully on coal and ordered him to use it and discontinue the use of gas. There has been to date watchful waiting on the part of the producer observing the declarations of the Commission that it has and that it has not "end use" powers. Perhaps the consensus of producer opinion now is that legislation is needed to hold the Commission within the limits originally fixed by Congress.

I have used the term producer in the sense of both oil and gas producer for the simple reason that segregation for regulation purposes is impossible; I have attached notes and references supporting the views expressed.

Appendix

15 U.S.C.A. 717.

Legal Aspects of the Natural Gas Industry — Interstate Compact Commission, June 15, 1945.

Four Years under the National Gas Act — Marshall Newcomb, Dallas, Texas, April 28, 1943.

Effects of Federal Regulation under the Natural Gas Act upon the Production and Conservation of Natural Gas—Marshall Newcomb, Dallas, Texas, October 15, 1945.

The First Five Years under the Natural Gas Act—Report of Federal Power Commission, January, 1944.

State Tax:
- United Fuel Gas Company v. Hallanan, 257 U. S. 277;
- State Tax Commission of Mississippi v. Interstate Natural Gas Company, 284 U. S. 41.

State Rate:
- Public Utilities Commission for the State of Kansas v. Landon, Receiver, 249 U. S. 236;
- Missouri v. Kansas Natural Gas Company, 265 U. S. 298;
- Peoples Natural Gas Company v. Public Service Commission of Pennsylvania, 270 U. S. 550.

State Exportation:
- Commonwealth of Pennsylvania v. State of West Virginia, 262 U. S. 553;
- West v. Kansas Natural Gas Company, 221 U. S. 229

Physics and Law — Commerce in Gas and Electricity, LVIII Harvard L. R. 1072 (September, 1945).

State Conservation:
- Champlin Refining Company v. Corporation Commission of Oklahoma, 286 U. S. 210;
- Railroad Commission of Texas v. Rowan and Nichols, 310 U. S. 573;
- Walls v. Midland Carbon Company, et al, 254 U. S. 300.

The Natural Gas Act:
- Illinois Gas Company v. Public Service Company, 314 U. S. 506;
- Public Utilities Commission of Ohio v. United Fuel Gas Co., 317 U. S. 456;
- Colorado Interstate Gas Company and Related Cases, 65 S. Ct. R. 821; 829; 850.

The Cole Hearings:
- H. R. 290 and H. R. 7372—Petroleum Investigation, Government Printing Office, 1940.

"In Commerce" and "Affecting Commerce" Legislation—Federal Trade Commission v. Bunte Bros., Inc., 312 U. S. 349.

Colorado Interstate Gas Company and Related Cases, 65 S. Ct. R. 821; 829; 850.

Columbian Fuel Company Case, 2 F.P.C. 200 — Peoples Natural Gas Company v. Federal Power Commission, 127 F. (2d) 153;
- Interstate Natural Gas Company, Inc., 3 F.P.C. 416; 2 F.P.C. 288.

Colorado Interstate Gas Company and Related Cases, 65 S. Ct. R. 821; 829; 850.
- Federal Power Commission v. Hope Gas Co., 320 U. S. 611.

Energy Resources and National Policy—National Resources Committee, January, 1939, Government Printing Office.

Special Senate Committee Investigating Petroleum Resources, June 20, 1945.

Federal Power Commission, Docket G-580, Natural Gas Investigation—Hearings, Kansas City, Oklahoma City, New Orleans.

Internal Revenue Code — Regulation 111—Collector of Internal Revenue.

Mexico Oil Expropriation — Government of Mexico, Mexico City, 1940.

Federal Power Commission v. Hope Gas Company, 320 U. S. 611.

Five Years under the Natural Gas Act, supra.
- Hope Gas Company-Federal Power Commission opinion, April 26, 1944.
- Tennessee Gas and Transmission Company - Federal Power Commission, September 24, 1943.
- Memphis Natural Gas Company-Federal Power Commission, June 13, 1944; November 21, 1944.
- Department of Conservation of Louisiana v. Federal Power Commission, 148 F. (2d) 746.

Northern Natural Gas Company Case (no citation); G 533 Release 2841 (G 772).

Connally Hot Oil Act, 15 U.S.C.A. 715.

Mississippi Production

H. M. Morse, state oil and gas director of Mississippi, has announced that the state's oil production has exceeded 100 million barrels.

Southwest and Midwest AGA Conferences Scheduled

The first AGA Midwest Personnel Conference under the chairmanship of C. C. Jolley of the Natural Gas Pipeline Company of America will be held at the Fontenelle Hotel, Omaha, Nebraska, January 8. Gas company officials concerned with industrial relations problems in Arkansas, Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota and Wyoming will be welcome.

The AGA Southwest Personnel Conference will be held at the Jung Hotel, New Orleans, January 11. Arrangements for the conference are being made by the vice chairman, Howard Senyard, of the Louisiana Power & Light Company.

Continental Announces Key Personnel Changes

Changes in key personnel of Continental Oil Company's marketing department have been announced as follows:

George J. Woods, manager of the Chicago division, transferred to Ponca City, Oklahoma, succeeding P. J. Ryan as manager of sales operations; Ryan retires next June. Woods is succeeded at Chicago by J. L. Wait.

J. W. Liddell, manager of railway sales, Chicago, appointed northern sales manager, Chicago, with supervision over the Chicago, Kansas City and Lincoln divisions; E. F. Shannon succeeds Liddell. W. F. Hird, division manager at Lincoln, named manager of the Ponca City division, succeeding J. G. Davis, who was named commission representative at Tulsa. W. R. Fitzpatrick succeeds Hird.

W. B. Elliott, division manager at Denver, was named division manager at Albuquerque, N. M., succeeding J. P. Anthony, who was named commission representative at Colorado Springs. P. M. Hirth, manager of the Salt Lake City division, was appointed Denver division manager and is succeeded by L. R. Kump.

New USGS Map Shows South-Central Montana

Possibilities of discovery of deep oil pools in known structures and of finding commercial oil accumulations in stratigraphic traps in south-central Montana are indicated in a map and summary report published by the U. S. Geological Survey.

Information is based on a study of drill cuttings from wells previously sunk in the area, carried out in cooperation with the Montana Bureau of Mines and Geology.

"Most of the obvious structural traps in the region have been tested, but few have tested the deeper potentially productive horizons," it was stated. "Of the deep tests that have been drilled, many were drilled before modern methods of detecting oil horizons were in use. Little testing of stratigraphic traps has been undertaken, but some favorable pinching out of rock units is known to exist."

Issued as Preliminary Chart 19 of the Oil and Gas Investigations series, copies may be purchased at 40 cents each from Survey offices in Washington, Billings, Montana; Tulsa, Denver and Casper, Wyoming.

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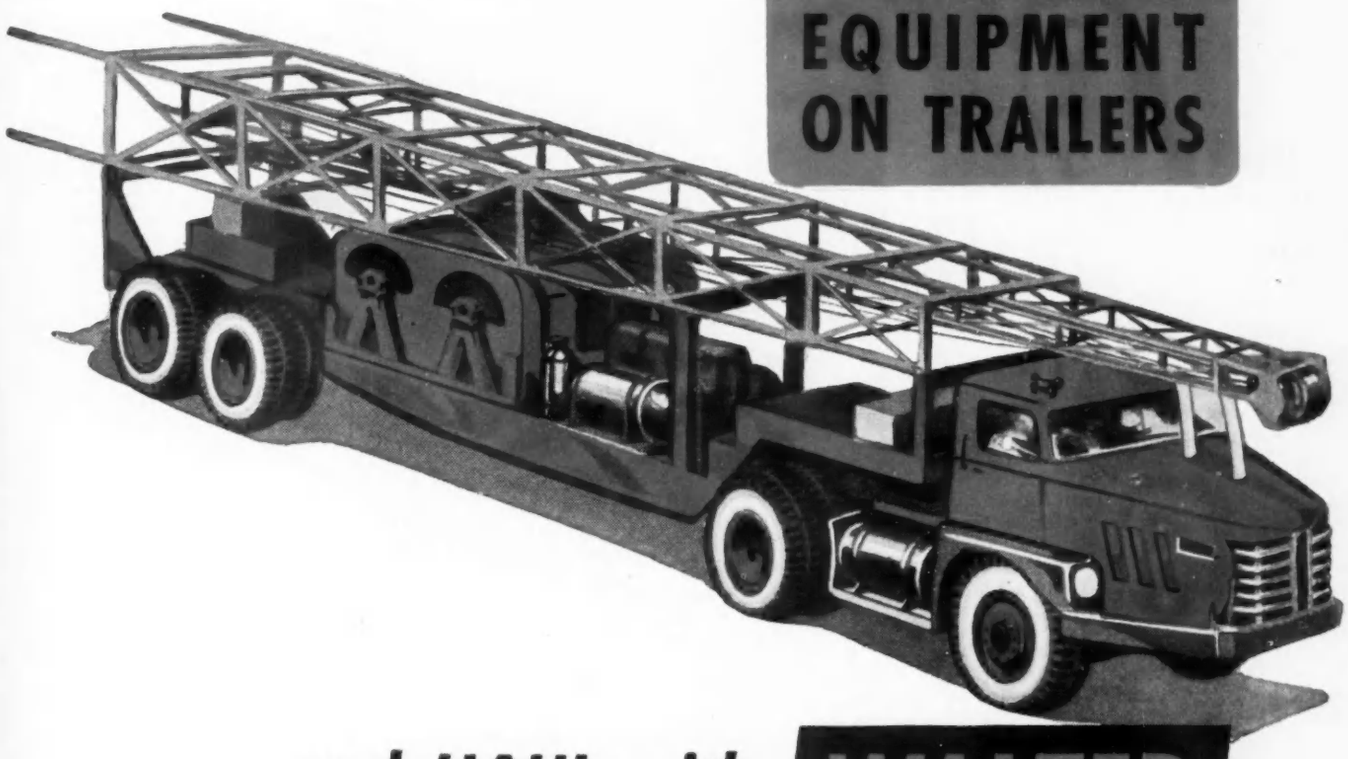

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Modified Service Truck Protects Equipment and Doubles Bed Capacity

An unusually efficient modification of the pick-up truck body employed by pumpers of one producing company is illustrated. Customarily left open, the back end of this slightly elongated pick-up body was decked over with a flat piece of steel. A tail gate was installed in the usual place, but was designed so as to completely enclose the lower, or covered portion of the truck bed. Tools and small miscellaneous materials needed for well-servicing are kept in this enclosed portion while the decking may be used as a work bench where a clean, smooth surface is desired for cleaning or working on parts, filling grease guns, etc. Another steel enclosure having sloping, hinged covers is mounted athwart the body just back of the cab. Louvres in the side provide ventilation so as to minimize possibility of generation of spontaneous combustion or ignition of inflammable materials contained in it.

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A small solvent tank having a ½-inch valve outlet is handily mounted within easy reach on the side of the bed.

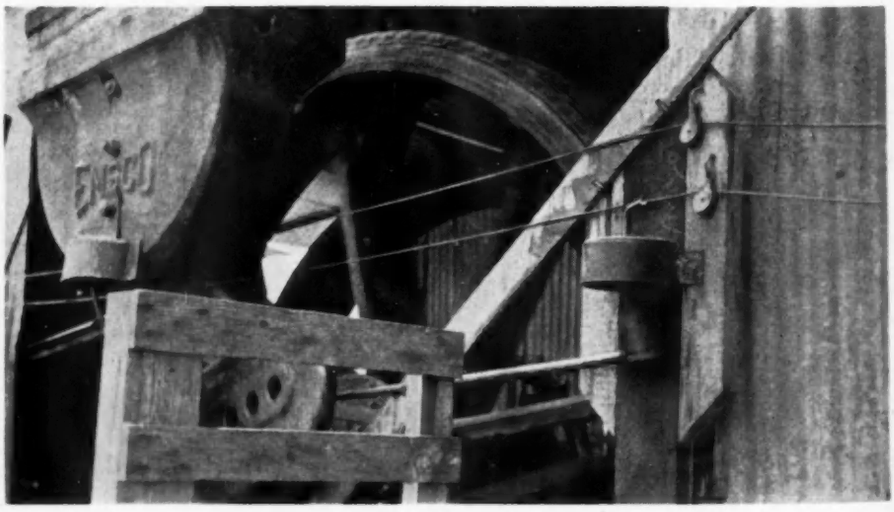
Fire hazard created by exhaust from the truck while parked beside wells or flow tanks is minimized by bringing the exhaust through the running board a foot or so above the cab roof.

Lubricant Reservoirs Extend Servicing Periods

Constant and assured good lubrication of a standard-end pumping unit may be had by the installation of auxiliary reservoirs which hold a generous supply of oil which is fed constantly into both sides of the crank and pitman bearings. Designed to eliminate some of the hazards brought on by insufficient and inexperienced labor as well as to insure lubrication of outlying wells, the small dust-proof reservoirs are designed to provide a small but uninterrupted flow of oil to the bearings. One of the containers is a half-section of pipe welded to a bracket bolted to the lower end of the pitman counterweight, a small line extending from its bottom down to the crank bearing. Supplying the more inaccessible back side of this same bearing is another reservoir bolted to the side of the belt hall. Oil flows through a long pipe line to the oil chamber in the bearing cap, and necessitates no shut-down of the well in order to service this dangerous and difficult-to-reach point.

OILING SYSTEM

Both oil reservoirs are made from heavy pipe material and are attached to the well so that constant vibration and swinging of the crank will not loosen them. Such a lubrication system enables the pumper to spend much less time at each well, it being necessary only to check the reservoirs and see that oil is flowing into the bearings. Only at infrequent intervals is it necessary to refill the reservoirs.



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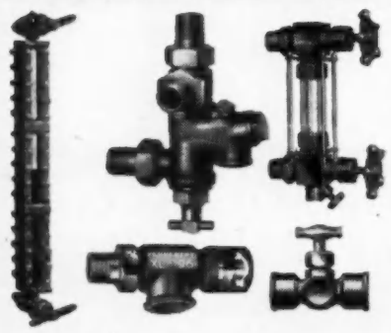

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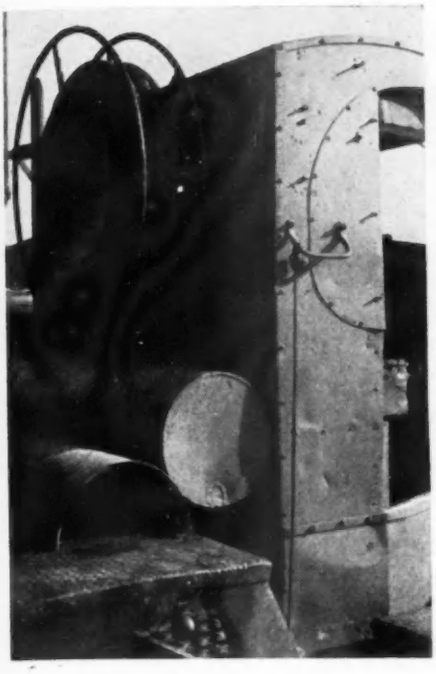
PRODUCTION HINTS

Reel-Mounted Fuel Hose Eliminates Shut-Downs



TRUCK FUELING

A convenient, time-saving method of hooking up fuel gas for the portable, truck-mounted pulling unit is contained in the installation mounted on the rear of the truck cab shown. On a shop-made reel is a long hose which may be unwound to be connected into any fuel gas line fitting around the well location. The reel is essentially a light cylindrical tank to which is attached a pair of hand-wheels, the latter permitting easy turning by one man in reeling and unreeling the long hose. Incoming gas flows through the hose and into the rack chamber, and from there passes through a packing gland in the reel axle to a pressure regulator installed beside the reel. Low pressure gas is stored in a cylindrical volume tank mounted immediately beneath the reel. The complete assembly takes up little space.

Principal advantages of this installation are its compactness, accessibility to workmen, together with flexibility of handling, such as being able to take gas with equal ease from either side of the truck unit, and from more than the usual distances.

Auxiliary Weight Speeds Tubing Block Return

WELL SERVICING

While the tool-pusher for a Kansas company was away from the job a rather green crew attempted to string up the tubing lines. Since the same line was used for tubing and rod jobs, the rod weight was already on the end of the tubing set-up. Due either to neglect or ignorance, the weight was left on and fastened into the top of the block when changing the string-up.

On his return the tool-pusher noticed the set-up, but adjudged it as safe, and began the job of pulling tubing. To his surprise, the block descended from the tubing board in about one half the time required without the aid of the weight, and there was lessened tendency of the block to twist in the derrick.

Since then the use of the rod weight atop the block is standard procedure for crews working for this company, and the time formerly consumed waiting for the block to descend from the board is appreciably lessened and operations consequently speeded up.

$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas

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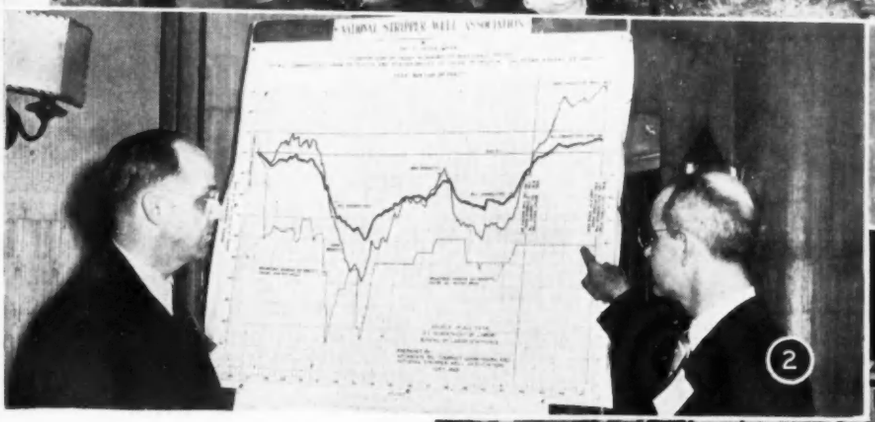
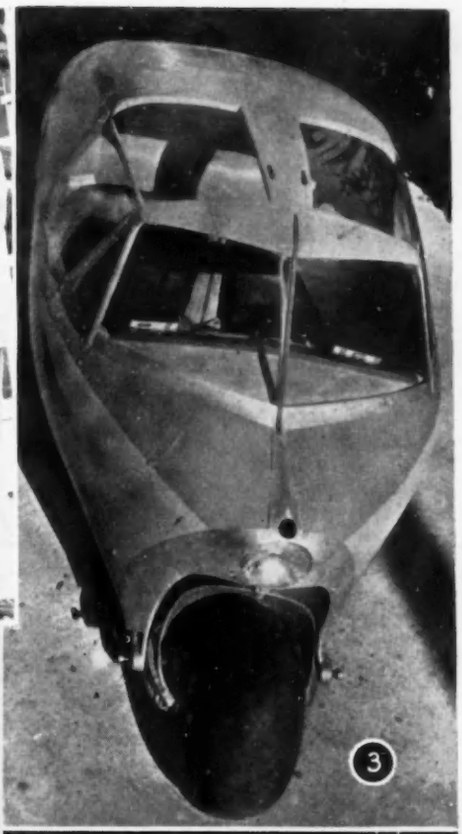




1. The six Hollandsworth brothers, all in the oil business, were reunited with their mother at Longview, Tex. Left to right, B. T. Hollandsworth, Bakersfield, Calif.; G. J. Hollandsworth, Longview; R. D. Hollandsworth, Bakersfield; Mrs. Levicie Jane Hollandsworth, the mother; R. B. Hollandsworth, Dallas; E. L. Hollandsworth, Longview; and F. G. Hollandsworth, Longview.

2. E. G. Dahlgren (left), technical secretary, Interstate Oil Compact Commission, and George Pasquella, consulting geologist and engineer, National Stripper Well Association, present a national stripper well survey chart at the compact's recent meet.ng in Wichita, Kans.

3. Flivver of the future, equally at home on the highway and in the sky. Its detachable wings, with a 36-foot spread, are donned at the airport and detached at the destination. The split-personality vehicle has a 75-horsepower engine. —Acme Photo

4. Discarded producer gas generators are lined up for sale at the central garage of the Stockholm Bus Company. Now that the Swedish city's buses are again running on gasol.ne, old generators are being scrapped, while those in good condition are being sold to farmers who may not be able to get gasoline for a while. —Acme Photo

5. New executive board of the Oil and Gas Association of Michigan. Top, left to right, Glenn F. Bush, Grand Rapids, The Ohio Oil Company, co-treasurer; Harold M. McClure, Alma, legislative secretary; William M. Peck, Saginaw, The Pure Oil Company, co-treasurer. Lower, William P. Clarke, Saginaw, Gulf Refining Company, president; Arthur H. Ledbetter, Mt. Pleasant, McClanahan Oil Company, business secretary.

Crude Production and Refinery Runs Higher but Fuels Taken From Storage

Both crude production and refinery runs in the United States rose above 4½ million barrels daily in the week ended December 15, reports to the American Petroleum Institute showed, and production of distillate fuel oil increased. But stocks of both distillate and residual fuel oils were drawn upon heavily in meeting the large seasonal demand. Stocks of gasoline showed about a normal seasonal increase in spite of a reduction for the week in production of that product.

U. S. crude production averaged 4,515,000 barrels daily, up 56,000 from the previous week although 181,000 barrels a day or about 4 percent less than output in the corresponding week last year. Crude runs to stills averaged 4,562,000 barrels per day, having increased 89,000 barrels over the preceding week and to a level within 14,000 barrels of the 4,576,000 daily in the like week a year ago. Crude oil stocks totaled 218,355,000 barrels on December 8, the Bureau of Mines reported. They were off 490,000 barrels from a week previous and about 2 million barrels or 1 percent under the 220,258,000 barrels reported as of December 9 last year.

Production of gasoline at U. S. refineries, including natural blended, totaled 14,644,000 barrels for the week ended December 15, down 264,000 barrels from the week before but 699,000 barrels or 5 percent more than the 13,945,000 barrels made in the comparable week last year. Stocks of finished and unfinished gasoline increased by 2,039,000 barrels during the week and then totaled 89,043,000 barrels, an amount 6,047,000 barrels or 7 percent above the 82,996,000 barrels held a year before.

Distillate fuel oil production of 4,905,000 was 236,000 barrels more than in the previous week and 562,000 barrels or 13 percent more than the 4,343,000 barrels turned out in the like week last year. Stocks of distillate fuel were cut down by 1,438,000 barrels within the week and then totaled 40,968,000 barrels. That amount was 791,000 barrels or 2 percent less than the 41,759,000 barrels held December 16 last year.

Residual fuel oil production of 8,107,000 barrels for the week was 438,000 barrels less than in the previous week and 1,051,000 barrels or 11.5 percent less than the 9,158,000 barrels produced in the comparable week last year. Stocks of residual were reduced 1,781,000 barrels and then amounted to 42,962,000 barrels. That quantity was 16,156,000 barrels or 27 percent less than the 59,118,000 barrels on hand December 16 last year.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1-4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1-8
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	47,187	11-27	72,881	1-2
1944	4,762	9-30	4,798	12-30	240,992	1- 1	89,162	4- 1	48,162	10-28	64,744	10-7
1945	[1]4,944	7-14	[1]5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1-6
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 3
1941	3,364	1-11	3,490	1-18	240,329	11-15	79,923	10- 4	28,382	4-12	90,914	7-13
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-18	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	220,258	9- 9	76,302	1- 1	30,232	4-19	49,737	3-18
1945	3,621	10-6	3,409	10-6	[4]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26

TRENDS OF 1944 AND 1945

Trends in Week Ended:	Crude Oil		Gasoline			Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1944:									
January 1	4,357	4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,380
January 29	4,400	4,359	240,251	13,427	81,075	4,054	37,266	8,889	52,857
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,018	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 29	4,431	4,300	235,342	13,126	88,342	4,284	30,236	8,398	49,985
May 27	4,514	4,532	234,423	13,502	86,468	4,702	32,035	8,568	49,812
July 1	4,587	4,638	228,860	14,052	83,559	4,496	35,360	8,872	52,235
July 29	4,608	4,627	225,112	14,115	82,665	4,833	38,135	8,900	56,280
August 26	4,667	4,698	222,931	14,112	80,740	4,566	41,453	8,680	59,839
September 30	4,762	4,775	222,393	14,494	78,028	4,622	45,329	9,292	64,226
October 28	4,740	4,658	223,235	14,117	79,058	4,772	48,705	8,985	64,382
December 2	4,712	4,693	221,591	14,853	80,427	4,082	45,832	8,981	61,727
December 9	4,704	4,552	220,258	14,611	80,880	4,056	44,430	8,923	60,458
December 16	4,695	4,537	222,075	14,145	82,747	4,353	42,413	8,727	59,280
December 23	4,729	4,682	222,575	14,635	83,355	4,605	40,846	8,798	58,509
December 30	4,705	4,798	222,998	15,342	86,614	4,257	39,495	9,156	57,430
1945:									
January 27	4,727	4,756	221,310	14,957	88,223	4,843	33,561	9,252	51,119
February 24	4,777	4,803	219,351	15,500	95,972	4,958	28,753	9,084	46,713
March 31	4,781	4,677	223,782	14,644	98,758	4,548	26,889	9,184	41,745
April 28	4,805	4,780	223,474	14,633	94,068	4,636	28,273	9,379	39,813
May 26	4,887	4,950	222,831	15,194	89,121	4,667	29,184	9,670	38,548
June 2	4,859	4,804	224,079	15,317	88,696	4,857	29,819	9,437	39,022
June 9	4,853	4,827	221,552	15,256	78,896	4,842	30,339	9,382	38,996
June 16	4,888	4,915	221,932	15,132	87,504	5,342	30,397	9,252	39,482
June 23	4,898	5,002	220,974	15,367	87,462	5,014	31,761	9,558	39,893
June 30	4,903	4,999	220,781	15,546	86,472	4,910	32,213	9,077	40,488
July 7	4,886	5,006	217,250	15,082	86,329	4,875	33,667	9,238	40,754
July 14	[1]4,944	4,945	216,355	15,349	85,401	5,197	34,804	9,337	41,489
July 21	4,944	4,927	218,108	15,430	85,930	5,090	35,458	9,071	42,480
July 28	4,930	4,996	218,507	16,106	86,008	4,598	36,071	9,586	42,282
August 25	4,892	4,931	[4]211,813	15,986	84,693	4,960	39,782	9,356	46,201
September 29	4,357	3,812	222,387	11,913	79,552	3,940	43,689	7,047	46,853
October 27	4,273	4,838	224,230	15,530	74,335	5,159	43,472	8,691	45,943
December 8	4,459	4,473	218,355	14,908	87,004	4,669	42,406	8,545	44,743
Dec. 15, 1945	4,515	4,562	.....	14,644	89,043	4,905	40,968	8,107	42,962
Dec. 16, 1944	4,696	4,576	220,258	13,945	82,996	4,343	41,759	9,158	59,118
Change:									
In week	+56	+89	—490	—264	+2,039	+236	—1,438	—438	—1,781
In year	—181	—14	—1,903	+699	+6,047	+562	—791	—1,051	—16,156
In year	—3.9%	—0.3%	—0.9%	+5.0%	+7.3%	+12.9%	—1.9%	—11.5%	—27.3%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, December 9, 1944.

Personnel Changes Made by Big Chief Drilling Firm

Revision of the corporate structure of the Big Chief Drilling Company and allied oil interests was announced by W. T. Payne, founder and president of the organization. Changes made give Payne more time for civic activities and the affairs of the American Association of Oilwell Drilling Contractors, of which he is president.

Personnel changes include the appointment of Jack H. Abernathy, formerly assistant general production superintendent for Sunray Oil Corporation, Tulsa, as vice president, manager and assistant to Payne; Sidney Hodges, vice president in charge of drilling; F. E. Godfrey, secretary-treasurer. Hodges had been tool pusher for Big Chief Drilling Company and a partner in Hodges-Payne Drilling Company.

Lower Revenues Reflect Crude Movement Decline

A decline in crude movement is reflected in a combined report for 47 of the county's largest pipe line companies which shows a drop of 3 percent in revenue during the third quarter of 1945 compared with the same period the year before. Total transportation revenue for the 47 companies during the third quarter was $72,104,368 while oil which originated in the lines or received from connections totalled 560,913,766 barrels, a decline of 1.7 percent. During the second quarter of 1945 revenue for the 47 companies totalled $75,783,065, and increase of 4.6 percent over the second quarter in 1944, and volume of oil moved amounted to 589,982,122 barrels, an increase of 6.9 percent over the volume during the preceding quarter.

There were some exceptions. Increases were noted for Interstate Oil Pipe Line Company (up on volume but lower on revenue), Standard Pipe Line Company, Texas - Empire Pipe Line Company, Texas-New Mexico Pipe Line Company and The Texas Pipe Line Company.

Great Lake Pipe Line Company's traffic was 2,722,593 barrels, an increase of 9.8 percent and revenue $6,328,532, an increase of 10.4 percent. Phillips Pipe Line Company had revenue of $1,848,125, up 10.4 percent, and traffic was 4,626,541 barrels, up 14.5 percent. Plantation Pipe Line Company was off 8.6 percent in volume and 5 percent in revenue. Southeastern Pipe Line Company was up 3.6 percent in volume of oil moved but reported a drop of 2.9 percent in revenue. The figures for the 47 companies were compiled by the Interstate Commerce Commission.

82-Mile Products Line Is Planned on Texas Coast

An 82-mile, six- and eight-inch products line is planned by the Warren Petroleum Company from the Lake Creek gas and condensate field, Montgomery County, Upper Texas Coast, to Norsworthy Terminal on the Houston ship channel. The Lake Creek field is one of the largest condensate pools on the Texas Coast. Some wells in this pool are completed in three sands.

Contract for this construction has been awarded to Associated Contractors and Engineers, Houston firm. Work will get under way early in 1946.

East Texas-Louisiana Line Put in Operation by United

United Gas Pipe Line Company has completed its 142-mile, 24-inch gas line from the Carthage gas field, East Texas, to Sterlington, Louisiana, which cost approximately $7½ million.

Similar in pipe size to the "Big-Inch" pipe line, the carrier is now in operation. The whole project, including a gasoline plant at Carthage, Texas, should be completed early in 1946.

Through the new line, United is in position to augment gas supplies in the Monroe area, and to furnish gas to Tennessee Gas & Transmission Company through a connection at Sterlington.

Work is proceeding at Carthage toward the completion of the gathering system and the gasoline and dehydrating plants. These facilities are expected to cost more than $7 million, bringing the total cost of the project to approximately $14½ million.

The gathering system when finally completed will include construction of about 140 miles of pipe lines.

275,086,270 Barrels of Oil Handled by Big Inch

A total of 275,086,270 barrels of crude was handled by the War Emergency Pipelines, Inc.'s 24-inch carrier from its Longview, Texas, receiving terminal and station to tank car relaying points in Illinois and by direct line to East Coast refineries. First oil was pumped into the system December 31, 1942, and operations terminated mid-October, 1945. Water was used to displace the oil, while compressed air removed the water as a precaution against interior corrosion.

12-Mile Line Authorized From Gilbertown Field

Placid Oil Company, Dallas, has authorized the construction of a 12-mile eight-inch crude line that will extend east from the Gilbertown field, Choctaw County, Alabama, to a tank farm and barge loading terminal on the Tombigbee River. The crude will be shuttled by barges from this point to its 2500-barrel daily capacity asphalt refinery now under construction on the Warrior River near Tuscaloosa, Alabama. Low-gravity crude from the Langsdale field, Mississippi, also will be processed by the plant.

Empire Alters Plans for Two Expansion Projects

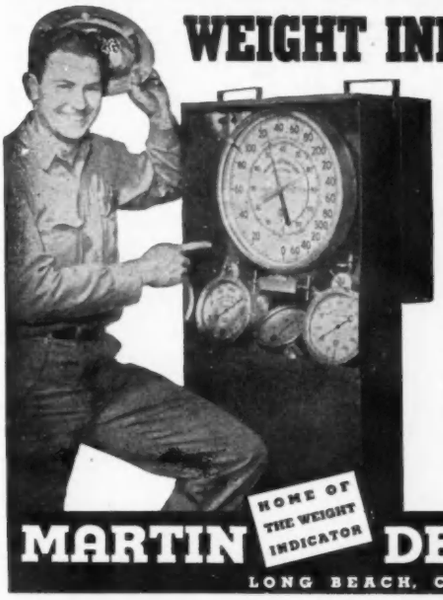
Inability to obtain delivery on equipment for the Sour Lake pump station and the intermediate station on the Sour Lake-Lake Charles line of Empire Pipe Line Company has resulted in a change in plans for the two expansion projects. Motor-driven pumps will be substituted at the intermediate station for the Diesel equipment originally planned. Pending delivery of Diesel-powered pump equipment at the Sour Lake station, one motor-driven centrifugal pump will be installed immediately. Upon delivery of the Diesel-driven unit, the motor-driven equipment will be used as a stand-by pumping facility.

Military Pipe Lines

Military pipe lines were discussed at the December 11 meeting of the Gulf Coast Section, AIME, Houston when T. J. Fuson, assistant division engineer of Humble Oil & Refining Company told about the India-Burma-China line and Robert Harrison of Boatright and Mitchell, Houston, discussed lines in the European theater. Other talks were by Albert Stephens of Texas A. & M. College relative to Rhine River crossings and Thomas Pennington on sabotage in Africa, Italy and Asia.

Construction Under Way On West Texas Pipe Line

Work has started on Texas-New Mexico Pipe Line Company's 34-mile, six-inch crude line from its Abell field to the Fort Stockton pool in Pecos County, West Texas. Fredell Construction Company has the contract.



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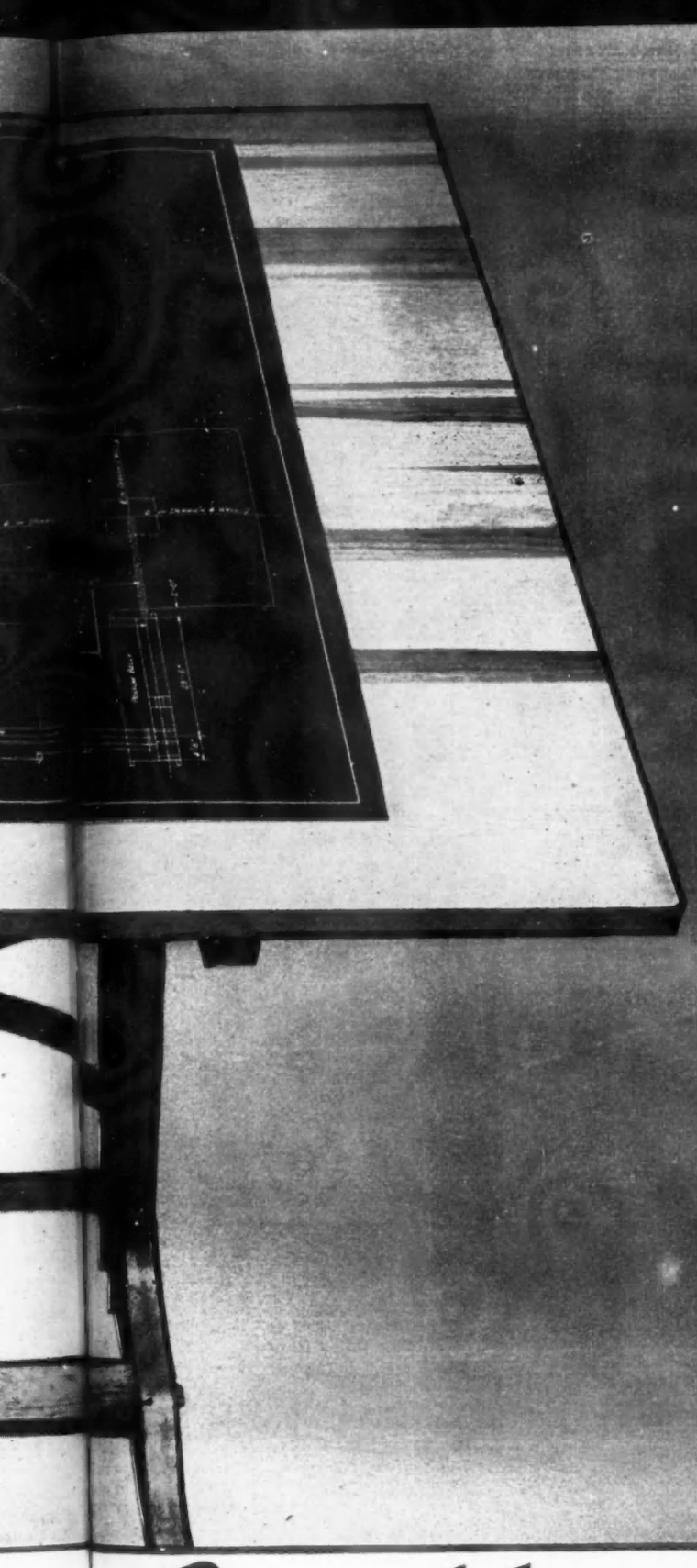

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Seismic Party Heads for Exploration Work in Iraq

A seismic party is on its way to Iraq in the Middle East on an assignment that will keep the members busy for the next two years. The party, headed by Carl W. Blakey, is being sent by the Seismograph Service Corporation, Tulsa, and includes Max Lloyd, Benson Merchant, W. T. Argue, R. F. Finley and James Lawler.

Gerald H. Westby, president of the Seismograph Service Corporation, said the party was formed and employed by the Iraq Petroleum Corporation. Previously this corporation had sent 12 crews to Venezuela, two to Colombia and one to Mexico.

The party's equipment is now on the high seas bound for Haifa, Palestine, which will be headquarters for the crew. Westby announced that Blakey will remain in the Middle East as the company's representative.

Australia's Deep Test Reported at 6765 Feet

Australia's deepest test for oil and gas, being drilled by Western Petroleum at Nelson Victoria, was below 6765 feet at last report. This wildcat venture is being financed by the Victorian and Australian governments.

Meantime, the Glen Davis Shale Works of National Oil Pty. Ltd. is expected to reach its production goal of 10 million gallons of gas by March 31, 1946. Sixty-four retorts still have to be converted but most of the materials were on the ground and work was proceeding rapidly.

Technicians are on the property of Freney Kimberley Oil to advise on new equipment required to put the company's drilling rig in order. Operations were suspended in 1942 because of the war at a depth of 4271 feet.

Australasian Petroleum Company, Pty. Ltd. and Papuan Apinapai Petroleum Company, Ltd., whose operations in New Guinea and Papua were interrupted by the war, expect to resume drilling activities early in the new year.

Bolivian Law Guarantees Investment of Foreigners

A new law "guaranteeing foreign investments" has been approved by the Bolivian government, under which foreign capital in Bolivia will benefit if it is invested in new enterprises or in the enlargement of established concerns engaged in the exploitation and processing of minerals, development of domestic and foreign commerce and certain other activities, according to the Bolivian Embassy in Washington.

Investment in any of these categories, other than agriculture, must amount to 5 million bolivianos ($125,000) or more to benefit from the law. Investment in agriculture must exceed 1 million bolivianos ($25,000), and all investments must be made by sale of foreign exchange at official rates to the Banco Central of Bolivia, or by importation of machinery and materials.

Investors desiring to take advantage of the law must make application to the Ministry of Finance, which will determine the conditions governing each case.

Profits on approved investments may be withdrawn in the same currency invested, or in any other, up to 15 percent a year. If profits are small or non-existent the first year, an accumulation of profits or special compensation may be authorized up to three years following.

Amortization of captial may be up to 20 percent in most cases, and when the incorporated capital has been recovered, money, machinery, etc., remaining in the country will be considered national capital.

Superior Oil Group on Way To Work Bahama Concession

The seismic fleet of The Superior Oil Company has been sent from Cameron, Louisiana, to the Bahama Islands to work concessions Superior obtained from the British Government under the name of Bahama Oil Company.

The concessions cover approximately 20,000 square miles which includes portions of the Andros Island and all waters on the Bahama bank west of Andros to the Keys on the east of the Florida Straits.

Movement of the seismic fleet a distance of 1500 miles will be one of the longest journeys of its kind ever made. R. E. Wilder is chief of the party.

Refinery Plans Approved

The Lebanon-American agreement establishing refineries in Tripoli has been approved by the Lebanese parliament. Tripoli is the terminus of the northern branch of the Iraq pipe line, the southern arm of which runs to Haifa, Palestine. The concession, for seven years, provides for two refineries.

Gas for Budapest

Utilization of natural gas from Lispe in Southwestern Hungary for domestic heating in Budapest is reported under consideration. Hungarian radio reports say technical experts visited the Lispe gas area recently and that construction of a natural gas line would be started very soon.

Stanolind Changes Made

Changes in personnel of Stanolind Oil Purchasing Company, Tulsa, were announced by Ralph O. Dietler, president, as follows:

A. L. Carlson has resigned as secretary and treasurer. F. J. Ryan has resigned as assistant secretary and assistant treasurer and has been promoted to treasurer with H. L. Crosby as assistant treasurer. Henry Waters, vice president, has been named treasurer, and Eloise V. Adams has been named assistant secretary.

☆ Oklahoma

Western Garvin County May Receive Important Strike

Important strike looms in Garvin County; Trigg gets good show northeast of Arcadia; Horns Corner sector gets good well; new pool likely north of Sasakwa; deep Carter wells go deeper.

Garvin County: A discovery which may prove important new reserves looms in Western Garvin County where Globe Oil and Refining Company et al's Gibson 1, CSE NE 30-2n-2w, about 5 miles southwest of Cities Service Oil Company's Antioch pool discovery, tested an estimated 6 million cubic feet of gas daily and flowed by heads on a 25-minute drill-stem test of a stray, but apparently prolific sand in the Pennsylvania series. The wildcat picked a sand at 6516 feet and drill-stem tested between 6519-54 feet with a 400-foot water load. Gas was recovered in six mnnutes and for the balance of the test the well flowed by heads into the pits. Officials reported a bottom-hole pressure of 225 pounds during the flowing test and that 500 feet of high-gravity crude were recovered. Operators are drilling to the Ordovician.

Logan County: J. E. Trigg of Oklahoma City, one of the state's most active wildcatters, appears to have a pool opener 6 miles northeast of the Arcadia field at LeGrande 1, NE NE SW 26-15n-1w, an abandoned well which the operator cleaned out, resurveyed and drilled deeper. The wildcat tested an estimated 15 million cubic feet of wet gas per day after being plugged back from 5864 feet to 5223 feet. The well was abandoned last year by The Texas Company after failing to find any shows in the Wilcox. Trigg worked out a deal with Harry Mee, who assembled the block and went into the hole again. Seven-inch casing was set at 5207 feet and Trigg was preparing to test the well further.

Hughes County: The Horns Corner sector, opened several months ago by Deep Rock Oil Corporation, reported another good producer at Deep Rock's Barnhart 1, SE NW NW 32-7n-10e. With the bit penetrating one foot of Cromwell sand the well flowed an estimated 340 barrels in the first 24 hours from 3877 feet, total depth. This pool has developed into one of the best producers in south central Oklahoma. The structure comprises a narrow belt some two locations wide and extending from Sect. 6 in a northeasterly direction to 21-7n-10e, a distance of more than three miles. Deep Rock has followed a conservative policy in developing the pool, which now has nine producers running about 24,000 barrels of oil per month.

Also in Hughes County, William Bartlett et al appear to have opened a producing area about 1½ miles north of the Southeast Sasakwa pool. The extent of the strike cannot yet be determined but geologists believe it will cover only a small area. The discovery well is the Howell 1, SE SW SW 10-6n-8e, which was completed for a pumping potential of 45 barrels of oil per day from the Booch sand at 2616-32 feet, total depth. Operators may deepen to test the Gilcrease and Cromwell sands.

McClain County: The Carter Oil Company continues to dominate the play in this area with five key wells drilling deeper. Thompson 1, NE SE 36-8n-4w, is making hole below 9087 feet; Vierson 1, CSE NE 8-7n-3w, is coring below 10,676 feet. Previous cores in the Dolomite recovered formations carrying oil shows; Autry 1, CSE SW 9-8n-3w, total depth 10,682 feet, is coring and drill-stem testing Hawkins 1, CNE NE 34-6n-3w, total depth 9344 feet is fishing. Mottinger 1, CNW NW 5-6n-3w, is drilling below 11,071 feet in hard white sand with lime, no shows reported.

West Edmond: With more than 700 producers, the field reported three additional completions along the souhtest flank of the four-county pool. Denver Producing and Refining Company's Sitlington 1, CNW NW 10-13n-4w, Oklahoma County, showed for 75 barrels on a 2-hour test from Bois D'Arc lime at 6627-74 feet. Stanolind Oil and Gas Company's Parman 4-B, CSE SE 28-13n-4w, flowed 155 barrels of oil in 20 hours after being acidized in the Hunton zone. Stanolind's Urschel 4, CNE NE 33-13n-4w, tested about 200 barrels of oil daily from the Bois D'Arc section at 7015 feet, total depth.

Cold Hampers Operations In Oklahoma and Kansas

Oklahoma and Kansas oil fields last week were gripped in the coldest weather in five years and operations have been curtailed an estimated 50 percent because of frozen highways, water lines and other winter hazards. More than 500 rigs were in operation in Oklahoma and some 350 in Kansas. At least 15 important wildcat wells in both states, some of them nearing the testing stage, are either completely shut down or making slow progress.

Snow and ice covered most of Kansas and central and northeastern Oklahoma. Although main highways were open, the public was urged not to use the highways unless absolutely necessary. Since

Wells Completed in United States in Week Ended December 22, 1945

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama													36	38
Arizona														6
Arkansas	5			2	7				4	4	11	5	195	228
California	23			1	24				3	3	27	37	2,056	2,004
Colorado	2				2				1	1	3	2	54	28
Florida													15	6
Georgia													6	8
Illinois	44			16	60	1					60	37	1,834	2,015
Indiana	11			11	22						22		306	329
Iowa													1	2
Kansas	25	10	1	6	42	1			2	2	44	40	1,713	1,694
Kentucky	33			10	43	1					43		609	809
Louisiana	12	4		4	20		2		3	5	25	25	1,055	765
North Louisiana	6	4		3	13		1		2	3	16	15	446	282
South Louisiana	6			1	7		1		1	2	9	10	609	483
Michigan	5	1		1	7		1		6	7	14	21	754	674
Mississippi	3				3						3	3	364	208
Missouri													52	55
Montana												2	230	329
Nebraska													5	18
New Mexico	8			4	12						12	8	413	412
New York	15		10		25						25	29	1,108	1,227
North Carolina													1	
Ohio	1	2	1	2	6						6	8	912	1,001
Oklahoma	22	8		7	37	2	1	1	5	7	44	46	2,294	1,848
Pennsylvania	28	8	15	1	52						52	42	2,775	3,006
South Dakota													1	
Tennessee													3	9
Texas	52	13		10	75	1	4	2	24	30	105	149	7,154	6,004
E.Tex.Bor. Co.'s		1			1			2		2	3	1	122	34
E. Texas Field														4
Rest of E. Tex.	10	1		1	12						12	3	252	274
North Texas							2		6	8	8	68	1,771	1,385
W. Central Tex.	15	2		4	21				1	1	22	4	469	413
West Texas							1		2	3	3	27	1,653	1,612
Tex. Panhandle	1	5			6						6	9	580	223
G. Coast, Upper	15	2			17				5	5	22	15	701	599
G. Coast, Lower	7	2		2	11	1			4	4	15	24	1,043	907
Southwest Texas	3			3	6		1		6	7	13	5	470	450
S. Central Tex.	1				1						1	1	93	103
Utah														1
Washington													1	
West Virginia	15	1	1	3	20						20	19	791	955
Wyoming	4				4						4	5	199	173
Total U. S.	308	47	28	78	461	6	8	3	48	59	520	478	24,937	23,852

* Includes distillate wells. † Includes salt water disposal wells

oil men consider their operations vital at all times, the majority went about their business.

In Stephens County, fire damaged Continental Oil Company's Schiefer 1, one of two wildcat tests on the west flank of the Milroy pool. The well was damaged when flames swept through ground structures. Some damage resulted to the derrick and motors. The fire was believed to have started from a welder's torch.

Communications have also been affected and major oil companies reported private telephone lines damaged in many sections of Kansas and Oklahoma.

☆Kansas

Pawnee County Pool Opener Assigned Good Potential

Pawnee County pool opener assigned good potential; Skelly finals Barber County gas discovery; pool opener northwest of Wichita making salt water; dozen wildcats mark year-end activities.

Wildcat activity in Kansas took a year-end spurt as 12 new starts yere reported. Three of the tests are in Rice County; Stafford got two, and Marion, Reno, McPherson, Rooks, Riley, Sheridan and Trego counties, one each.

Barber County: After acidizing with 6500 gallons, Skelly Oil Company completed Boggs 1, NW NW NE 8-33s-12e, new gas discovery about 2 miles east of the Medicine Lodge gas field. Producing from the Mississippi lime between 4471-93 feet. the discovery was completed for an estimated 5 million cubic feet of gas per day.

Sedgwick County: Beech Aircraft Corporation was plugging off salt water at McLean 1, NW SE NW 1-27s-1e, prospective pool opener near Wichita. The well had been estimated at 75 barrels of oil daily from perforations in the Lansing lime between 2975-77 feet. Operators are confident that water trouble can be overcome and the well put on the pump.

Pawnee County: Hildebrand et al's Wockstrom 1, NW NW NW 12-20s-16w, pool opener for the Ryan South pool, has been assigned a daily potential of 143 barrels. The discovery is between the Pawnee Rock pool and the Ryan pool and some geologists believe both sectors will join eventually. Two offsets to the Wickstrom are being drilled by Magnolia Petroleum Company.

Rooks County: A show of oil in the upper Lansing lime between 3210-20 feet at Atlantic Oil Company's Carmichael 1, CSE NE 16-9s-17w, will be tested shortly with good prospects for opening a new pool about two miles west of the Westhusin field. Pipe was set in the Lansing with the top logged at 3206 feet. The wildcat is a mile southeast of an abandoned oil well.

Cowley County: Testing continues at W. L. Hartman et al's Smith 1, SE SE SW 15-33s-3e. Drilled to 4265 feet and with pipe set at 4247 feet on the Arbuckle, open hole between 4247-65 feet was given a nitro shot and the well filled with 200 feet of oil in one hour. The wildcat is about a mile east of the Rainbow Bend pool.

☆West Texas

Keystone Field Ellenburger Zone Is Defined to East

Ellenburger zone in Keystone field defined to east; Fullerton-Devonian area scores first Ellenburger production; production trend to southeast of TXL field partially defined; high-priced drilling site in Todd deep area doubtful for production.

Winkler County: Stanolind Oil & Gas Company's Taylor 1, a mile east of Ellenburger production, tested sulphur water at 10,213-280 feet in Ellenburger, topped at 10,245 feet, or 607 feet low. The structure dips equally as sharp immediately west of the productive area. Taylor 1 passed up possible gas in the Simpson and Silurian, while the 95-foot section of Devonian, topped at 8040 feet, warrants a further test for oil. Gulf's Keystone 8-E, a mile south of this deep failure and lower structurally, swabbed 62 barrels of oil and 5 barrels of water, with a good blow of gas, on 13-hour test of open hole at 8078-8860 feet, having plugged back from junk at 10,050 feet. The field has 55 flowing wells from the Ellenburger zone, while 4 failures adjacent to and outlying from production proved dry. There are 34 active tests.

Tide Water Associated Oil Company's Wheeler 2, north edge of the Wheeler field, flowed an average of 30 barrels of oil hourly, with gas-oil ratio 1128/1, from Devonian perforations at 8395-8495 feet. Production test was pending from perforations at 10,645-660 feet in Ellenburger, topped at 10,535 feet, or 5 feet low to the first well on lease. Sunray Oil Corporation's Wheeler 1, north offset to Wheeler 2, was coring for top of Ellenburger, having entered the Simpson at 9540 feet, or 5 feet high. It also correlates high on upper markers.

Andrews County: Mid-Continent Petroleum Corporation's University 3, Lease 11, south offset to its discovery for the Fullerton-Devonian 10-well area, was making new production at 10,696 feet in Ellenburger, topped at 10,596 feet, or 772 feet low to the recent Ellenburger strike near the apex of the Fullerton structure. A drill-stem test at 10,596-649 feet yielded 4590 feet of 35.5-gravity oil in addition to oil and gas-cut mud, then headed oil in pulling stem. A commercial producer is assured. Such a great difference in depth for closely situated fields is not uncommon, as a similar conditions prevails in the Keystone-Ellenburger and Kermit-Ellenburger, also the Wheeler and TXL fields.

Ector County: Phillips Petroleum Company's T. P. Land Trust 1-E-a, 1½ miles southeast of Devonian production in the TXL field and twin to a 6074-foot junked test, tested a small amount of oil and gas with a 5580-foot column of sulphur water in Basal Permian at 8040-163 feet. It is about 250 feet low. The Texas Company's T. P. Land Trust 1-D, 1¼ miles east of Devonian production, was drilling cherty-lime and shale at 10,578 feet in Simpson, topped at 9810 feet, or 1120 feet low to Shell's T. P. Land Trust 1-K, nearest Ellenburger producer. The field has 10 producers in the Ellenburger. The high point of this zone is credited to The Texas Company's Thomas 1, which was completed from 331 feet of the section.

Ward County: Continental Oil Company's Scott 1, south corner of H&TC Ry. 33, Block 33, and 3¾ miles southeast of Barstow, is assured of a small discovery in swabbing 50 barrels of oil daily while cleaning out after nitro shot at 4850-65 feet. The Delaware lime was entered at 4812 feet and sand at 4835 feet with elevation of 2548 feet, while the well is bottomed at 4873 feet.

Shell Oil Company's Sealy-Smith 7, southeast outpost for the Monahans multi-pay field, flowed 1394 barrels of 48-gravity oil, with gas-oil ratio of 1617/1, on natural test through ½-inch choke from Ellenburger at 10,058-376 feet. This well was completed in 6½ months, or about ½ the time required for some of the earlier tests due to the use of a 202-foot derrick, which is the record height.

Hockley County: Stanolind Oil & Gas Company's Wiley 7, northeast edge of the Slaughter field and the first well in the field to supplement vertical drainage with lateral holes, pumped 196 barrels of 30-gravity oil initial. This production is from open hole in San Andres at 4832 feet to 4935 feet, with 7 lateral holes, varying from 4 to 24 feet for an aggregate of 121 feet.

Honolulu Oil Corporation's Frazier 24, near the south edge of the Hockley County sector of the Slaughter field, was drilling dry lime at 7675 feet, although originally scheduled as a 7500-foot test. Top of the Glorietta was called at 5555 feet with elevation of 3508 feet, being low to previous Clear Fork failures.

Crockett County: Amerada Petroleum Corporation et al's Todd 1-J, west offset to Ellenburger production on the north end of the Todd structure; was coring at 6054 feet in Ellenburger, topped at 6018 feet with elevation of 2565 feet, correlating 22 feet low to the offset, which is producing from perforations at 6150-6270 feet. Todd 1-J logged only 15 feet of Crinoidal, topped at 5955 feet followed by 48 feet of dry Simpson. W. A. Moncrief-Ed Hyde-Eddie Showers et al's Shannon 1, ½ mile north outpost, was drilling Simpson shale at 6200 feet, and possibly 112 feet above the water level in the Ellenburger. This outpost logged considerable dry Crinoidal, but is low structurally. The group paid $1000 per acre cash and $1 million payable from production for a lease on the 80-acre site. Allowable production of the sweet crude produced from the Crinoidal and Ellenburger zones will be advanced from 44 to 110 barrels daily per well effective January 1 as result of hearing conducted by the Railroad Commission.

Moore Exploration Company et al's Halff-Bivins 1, southwest of the Noelke field, entered dry Ellenburger at 7222 feet with elevation of 2175 feet, and was drilling dolomite at 7495 feet, correlating 623 feet low to a 6977-foot failure 1¾ miles northeast.

Michigan API Elects

William E. Schoeneck of Grand Rapids, district petroleum engineer for The Ohio Oil Company, was elected chairman of the Michigan chapter, American Petroleum Institute, at the annual meeting December 11.

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☆Texas Panhandle

Stanolind Stakes 6500-Foot Wildcat in Hartley County

The Pure Oil Company's Skalsky 1, T. B. Russell survey, Hartley County 5000-foot wildcat, lost rotary returns and stuck drill pipe on bottom at 4034 feet in dolomite. Stanolind Oil & Gas Company's Beck 1, C NW NE Capitol Syndicate 20, Block 15, is a new 6500-foot wildcat test for Hartley County.

Wheeler County: J. E. Trigg et al's Higgins 1, SWc H&GN Ry. 25, Block A-4, a 5000-foot wildcat, was drilling anhydrite at 3710 feet.

Ochiltree County: Olney F. Flynn et al's Hoover-Patten 1, 6500-foot prospect, was using plastic plugs to try to seal off salt water encountered at 6195-98 feet.

☆North Texas

Continental Has Ellenburger And Possible Bend Strikes

Continental Oil Company scores Ellenburger strike in Clay County and prospective Bend discovery in Montague County; Crain pool has Mississippian failure; Belcherville area attaining importance.

Clay County: Continental Oil Company's Heard 1-C, SE SW TE&L Company 3222 and 3 miles southeast of the Joy multi-pay area, flowed 251 barrels of oil natural daily through 30/64-inch choke from dolomite at 6468-96 feet in Ellenburger, topped at 6463 feet. The well later flowed 73 barrels on a 3-hour test through 24/64-inch choke with 150 pounds working pressure on tubing and 840 pounds on casing. A commercial oil producer was passed up in Bend at 5740-81 feet.

Montague County: Continental Oil Company's Jarrell 1, SW SE TE&L Company 3433 and about midway between the McNutt 6700-foot Viola pool and the Sinclair-Eaves 5800-foot Bend discovery, was drilling shale at 6060 feet to explore the Ellenburger after passing up production. This wildcat entered the Bend at 5705 feet, with elevation of 941 feet, and recovered 210 feet of free oil and 180 feet of oil-cut mud when tester was used at 5715-34 feet.

Venmex Oil Company et al's Jordan 1, Block 21 and north offset to the Belcherville pool discovery, flowed 131 barrels oil natural on 3½-hour test through ½-inch choke from Bend conglomerate perforations at 5360-70 and 5412-22 feet. The partnership's Beakley 2, south of the discovery, flowed 420 barrels natural on 6-hour test through ½-inch choke from perforations at 5378-88 feet, while Grant 2, southwest offset to the discovery, was flowing into pits from perforations at 5348-58 feet, making 5 consecutive producers. The discovery was completed October 12, 1945.

Young County: R. C. Lipscomb et al's M. G. Herring 1, NEc TE&L Company 168 and 3 locations south of the Crain pool discovery, was deepening after testing dry at 4958 feet in Mississippi, topped at 4947 feet, or 28 feet low. L. T. Burns et al's Kunkel 1-a, south offset to the discovery and twin to a junked producer, cemented oil string at 4888 feet.

Archer County: Louisiana Land & Exploration Company's Lyles 1, SE NW Sect. 7, Hooper & Wade survey and 1½ miles southwest of the Mankins deep area, showed free oil in hole prior to drilling plugs from 7-inch casing at 5060 feet, indicating possible cement failure. However, a production test was under way from Mississippian saturation at 5065-74 feet.

Wilbarger County: Amerada Petroleum Corporation's Judd 1, 3¼ miles east by north of Fargo field, was drilling lime at 4558 feet in Strawn, topped at 4320 feet with elevation of 1183 feet. The Canyon was entered at 3385 feet.

Cooke County: Mid-Continent Petroleum Corporation's Morris 1, inside location for the Sivells Bend field, flowed 223 barrels of oil, with gas-oil ratio of 440/1, on 6-hour natural test through ¼-inch choke from the Beasley (Strawn) sand at 6895-6909 feet. It is the largest of 8 flowing and pumping producers.

☆ East Texas

Smith County Paluxy Test Deepened to Water Level

Promising Paluxy wildcat in Smith County has deepened to the water level; deep-seated Woodbine structure in Leon County yields small volume of oil; Calvert shallow area given extension.

Smith County: Humble Oil & Refining Company's Pool 1, William Saunders survey, was credited with having reached the water level in coring Paluxy sandy-shale below 7500 feet. This wildcat confirmed the favorable geophysical picture known for some years on the Mount Sylvan prospect by logging approximately 50 feet of oil-saturated sand in the upper Paluxy beds several weeks ago. The company withheld details in order to cure titles and acquire numerous outstanding lease interests within its large block.

Leon County: Claude Bell's Browne & Carson 1, Thos. H. Garner survey and 3 miles southeast of Flynn, was swabbing 15 to 30 barrels of 38-gravity oil daily after setting perforated liner on bottom at 7303 feet. Top of the Woodbine was entered near the 7100-foot level. This showing developed after prolonged swabbing tests.

Sand Flat Field: Humble's Griffin 1, north outpost and structurally low, was showing salt water and some oil on preliminary swabbing test of open hole at 7665-7788 feet in the Paluxy topped at 7311 feet with elevation of 592 feet.

Hopkins County: Delta Drilling Company's Livingston 1, 5 miles west by south of the Pickton field and a prospective gas-distillate producer in the Gloyd, topped at 8011 feet, was drilling hard sand at 8255 feet.

Wood County: Rogers Lacy and J. R. Caraway's Cox 1, Jas. Barfield survey and on the southwest edge of the Quitman field, was drilling at 5400 feet in Georgetown, topped at 5095 feet, being high structurally. This outpost passed up 23-gravity oil in the sub-Clarksville sand at 4214-32 feet.

Morris County: H. L. Hunt et al's Robison 1, John Brandon survey, entered the Glen Rose at 5955 feet, and was drilling shaley-lime at 6924 feet.

Smith County: Phillips Petroleum Company's Englander 1, 3½ miles south by west of the South Tyler field and deepest active test in the district, was drilling sandy-shale at 13,430 feet. Progress has been slow. Electrical formation survey was run at 13,400 feet.

Houston County: Al G. Hill and Chapel Hill Gas System's Mason 1, Stephen Hatton survey and 6½ miles southeast of Grapeland, was drilling barren sandy-shale at 6455 feet in Woodbine topped at 6355 feet. Austin chalk was called at 6105-6355 feet with the sub-Clarksville absent.

H. L. Hunt's Houston County Timber Company-Magnolia 1, M. W. Connor survey and 2 miles north of Hennard, logged Austin chalk at 6792-6822 feet with elevation of 338 feet, and was drilling at 7060 feet.

Robertson County: D. A. McCray et al's Norris 2, northeast outpost for the Calvert field, flowed at the rate of 200 barrels daily from sand at 2176-92 feet with the hole bottomed in shale at 2202 feet. This well is on acreage farmed out by the Hamman Oil & Refining Company, discoverer of the area, and extends production about ¾-mile northeast.

Harrison County: A failure in the Harleton area seems likely as Roger Lacy's Hyman Estate 1, E. Talley survey, is waiting on orders to abandon. A 15-minute drill-stem test from 5980-6100 feet recovered salt water and no shows.

Placid Oil Company's wildcat, Mattie Lee Knox 1, Benjamin Parker survey, 3 miles southwest of Harleton, is drilling below 6645 feet.

Marion County: Rogers Lacy's Scott 1, L. A. McLaughlin survey, is testing perforations in the Travis Peak. Total depth is 7530 feet.

Magnolia Petroleum Company's wildcat, Orr 1, R. B. Fowler survey, cored from 7345-57 feet without finding any indications of oil or gas and is drilling below 7360 feet.

Shelby County: Hiawatha Oil Company's Pickering Lumber Company 1, W. J. Brittian survey, is fishing for tools at 4688 feet. A drill-stem test from 3595-3613 feet recovered 100 feet of gas-cut mud.

Humble Oil & Refining Company's deep wildcat test, Pickering Lumber Company 1, St. Francois survey, after regaining circulation, is now drilling below 11,238 feet in shale and lime. The test has had indications of gas.

Gasoline Plant Planned

The H. W. Snowden interests of Texas plan a natural gasoline plant in the Cement pool of Caddo County, Okla., with a capacity of 30 million cubic feet per day and announce a 100-well drilling program in the Cement townsite and adjoining leases which the interests acquired earlier in the year for a reported $2 million. The Cement townsite has been unitized on a 40-acre basis and the city recently approved the drilling of one well to each producing zone on each unit.

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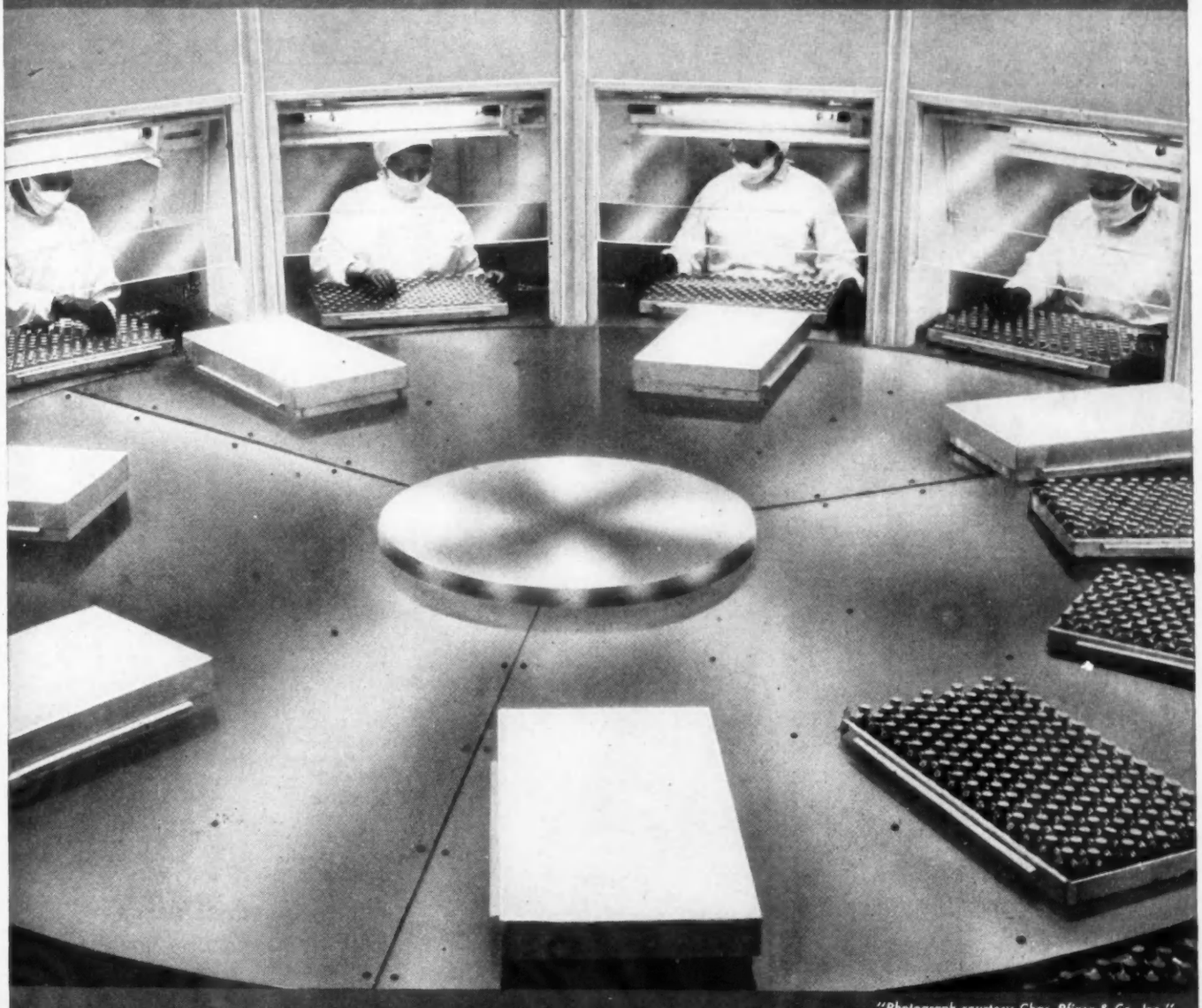

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☆ South Central Texas

Atascosa County Wildcat Being Tested by Humble

Humble testing Atascosa County wildcat; oil show logged in Lee County wildcat; Zavala and Dimmit counties tests coring deeper.

Atascosa County: Humble Oil & Refining Company's Henry Schorsch 1, wildcat ¾ mile southwest of Jourdanton, is swabbing after perforating casing at 7387-90 feet. On initial test at this level the well recovered salt water with some oil and perforations were squeezed. Total depth is 7405 feet with casing set on bottom.

Quintana Petroleum Corporation's Guy H. Smith 1, Waggoner survey, wildcat 13 miles southeast of Pleasanton, is testing through perforations in a shallow sand at 2200 feet. The well is flowing an estimated 40 barrels of fluid daily, about 60 percent oil and the balance fresh water. Total depth is 6065 feet with 5½-inch casing set at 2625 feet.

Zavala County: Humble's Marrs McLean 1, wildcat 6 miles east of Crystal, is coring below 3350 feet in hard sand and shale.

Dimmit County: Howard & Wheeler's Sarah W. Henrichson 1, wildcat 2 miles sortheast of Valley Wells, is drilling below 3520 feet in sandy shale.

Edwards County: Dan Auld's Peterson 1, AB&M survey, 6 miles northeast of Rock Springs, is drilling near 4250 feet after setting 7-inch casing at 4120 feet.

Lee County: Seaboard Oil Corporation of Delaware's Paul Hendrick 1, Potthast survey, 8 miles north of Paige, is coring near 8900 feet in sandy shale. Cores at 8785-98 feet and 8814-18 feet showed some oil at intervals. A drill-stem test at 8808-18 feet recovered gas-cut mud in 8 minutes.

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☆ Southwest Texas

Second Producer Indicated For Starr County Field

Second producer indicated for recently opened Parsons field in Starr County; wildcat in Webb County is failure; McMullen County test is spudded.

Starr County: The second well for the recently opened Parsons field seems assured at The Harrus Syndicate's M. M. Garcia 2, 933 feet southwest of the discovery well. On a drill-stem test at 3427-66 feet, the Garcia 2 recovered 700 feet of oily mud with 60 pounds working pressure in 18 minutes. The discovery well was completed through perforations at 3498-3512 feet in the lower Frio.

Webb County: John F. Camp's Marrs McLean 2, a mile northeast of Blanco-Buchanana's Bruni 1 discovery well and 2½ miles northeast of the Albercas field, has been abandoned at 2706 feet. A drill-stem test at 2335-40 feet recovered 50 feet of oil-cut mud and 9000 feet of salt water. Another test at 2674-78 feet showed only salt water. The Lopez was topped at 2335 feet and the Holbein at 2675 feet.

McMullen County: J. W. Gorman has spudded Ruiz Brothers 1, a 4000-foot wildcat 20 miles northeast of Freer in the AB&M survey 75. The government Wells sand at 2665 feet was dry.

Jim Hogg County: Contract has been awarded and operations to get under way immediately at Sid Katz's C. W. Hellen 1, wildcat in the El Randado survey 24, Block 16, about 16 miles southwest of Hebbronville.

Eight-Mile, East Texas Line Acquired by Lacy

Rogers Lacy, Longview operator, has acquired the Central Pipe Line Company's eight-mile, 4½-inch Hawkins field, East Texas district, crude gathering system and discharge line to tank car rack at Big Sandy. Lacy will utilize the line in supplying the Lacy Refining Company's 3500-barrel daily capacity asphalt refinery under construction at Big Sandy with controlled and purchased oil from the Hawkins area.

Phillips Hikes Capacity of West Texas Gasoline Plant

Phillips Petroleum Company has increased the capacity of its absorption type natural gasoline plant in the Fullerton field, largest sweet crude producing area in West Texas, from 12 million to 28 million cubic feet daily.

☆ Lower Texas Coast

Gas-Condensate Pool Being Opened in Jim Wells County

Shell opening gas-condensate pool in Jim Wells County; Bee County wildcat recemented; gauge reported on new Kleberg County wildcat producer.

Jim Wells County: Shell Oil Company's William Van Hoogenhuyze 1, wildcat 1½ miles southeast of the Wilson field, is reported testing gas and condensate through perforations at 9040-49 feet. The test was drilled to 9060 feet where it blew out and pipe was finally landed on bottom.

Bee County: Mills Bennett's Martha Berger et al 1, J. M. Uranga Grant, Ragley subdivision 19, wildcat 2 miles southwest of Tuleta, has recemented 7-inch casing at 8000 feet. Operator had landed pipe at the same depth several days ago but the well blew out while waiting for the cement to set.

Kleberg County: Humble Oil & Refining Company has spudded Monte Negra-King Ranch 2, about 1320 feet south and east of the Monte Negra 1 discovery well, and set surface casing at 1509 feet.

Humble's King Ranch-Borregas 1, new wildcat producer 8½ miles southwest of Kingsville, flowed 104 barrels of oil daily through a ⅛-inch choke from perforations at 6889-95 feet. Tubing pressure was 1250 pounds and gas-oil ratio 3100/1. Total depth was 8549 feet with 5½-inch casing landed at 6956 feet.

Nueces County: Ginther, Warren & Ginther have run potential gauge on Fee 2, dual sand producer in the Agua Dulce field. Perforated at 6885-98 feet, the well gauged 162 barrels of 39.9-gravity oil daily through a 7/64-inch choke with a tubing pressure of 1575 pounds.

☆ Upper Texas Coast

Deep Sand Strike Extends Hitchcock Field Northeast

New sand opened northeast of Hitchcock field; west flank producer completed at High Island; Spring field outpost is testing; Humble setting casing in Newton County wildcat.

Galveston County: Stewarts' Fee 16, James Spillman survey, has been completed in a new deep sand to push the Hitchcock field northeast. Perforated at 6523-26 feet, the well gauged 162 barrels of 33.7-gravity oil daily through a ⅛-inch choke with tubing pressure 910 pounds. Gas-oil ratio was 387/1. The regular field sand is between 5100 and 5200 feet. Operator is preparing to drill Fee 19, south of Highland Bayou.

On the west flank of the High Island field, John W. Mecom's Cade et al 2 has been completed for 896 barrels of oil daily through a ¼-inch choke from sand topped at 5652 feet. Tubing pressure was 725 pounds and casing pressure 600 pounds.

Harris County: Cheesman & Cranston's Mrs. L. V. Snyder 1, northwest outpost in the Spring field, is cleaning into pits without a gauge from perforations at 6242-45 feet.

The Texas Company's Bender Estate 1, deep test on the east flank of Humble dome, ran an electrical log at 12,972 feet and now is drilling below 13,030 feet in sand and shale.

Newton County: Humble Oil & Refining Company is setting a string of 5½-inch casing in W. W. Moore, Jr. 1, Wilcox sand wildcat test in the Bon Wier area. Total depth is 13,196 feet. Gas and distillate shows were reported in the Lower Wilcox sand at about 12,200 feet. This test is in the A. D. Stark survey, abstract 384.

Humble's Hankamer 2, confirmation test in the recently opened Sabine Tram field at South Call, failed on a drill-stem test at 8025 feet when the packer slipped.

San Jacinto County: Navarro Oil Company's Foster Lumber Company 3, 1515 feet southeast of the Foster 1 and southeast of the recently opened Cockfield sand production in the Coldsprings field, is swabbing through perforations at 7916-24 feet.

Brazoria County: Glenn H. McCarthy's Thomas W. Masterson 1, G. Robinson survey, about 2 miles northeast of the Blue Lake field, has been completed for 207 barrels of 33.6-gravity oil daily through a 9/64-inch choke from perforations at 8932-38 feet. Total depth is 10,549 feet with 5½-inch casing set at 9227 feet. Operator may attempt dual sand completion.

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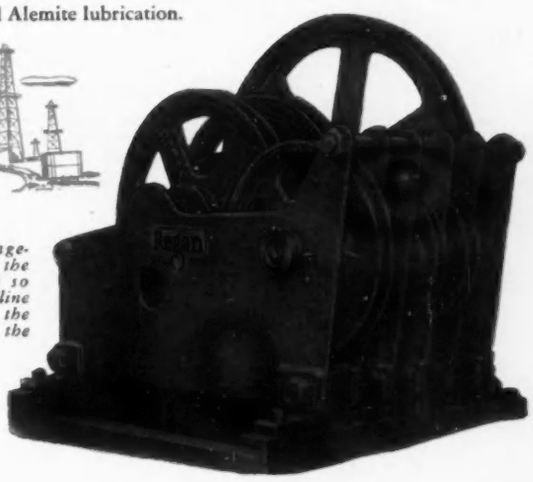

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☆ South Louisiana

Evangeline Parish Wilcox Sand Wildcat to Be Tested

Magnolia to test Evangeline Parish Wilcox sand wildcat; new sands opened at Napoleonville and Venice; Jefferson and Jefferson Davis parish wildcats testing.

Evangeline Parish: Magnolia Petroleum Company's J. B. Morein 1, Mamou area, 5-5s-1e, prospective Wilcox sand pool opener, is about ready to start testing after setting 5½-inch casing below 11,625 feet. The wildcat topped Wilcox sand at 11,510 feet which showed oil, and solid oil sand was reported logged to 11,553 feet. After a shale break, additional sand was topped at 11,575 feet. Sands showing oil were also reported in the Sparta with gas and condensate shows in the Cockfield. This wildcat is 6 miles south and 3 miles east of the Pine Prairie field.

Assumption Parish: Shell Oil Company has opened a new Miocene sand in the Napoleonville field at C. L. Triche 1, in the southwest corner of 33-12s-13e. Perforated at 9462-67 feet, the well flowed 245 barrels of 34.3 gravity oil daily through an 8/64-inch choke with 1825 pounds on tubing and 1500 pounds on casing. Total depth was 9763 feet with 5½-inch casing set on bottom. The new sand was logged at 9430-78 feet. Regular production in the Napoleonville field is from the Miocene, topped at about 9000 feet.

Plaquemines Parish: The multiple-sand Venice field has developed a second sand below 11,000 feet with the completion of Tide Water Associated Oil Company's Buras Levee District 38 in 23-21s-30e. Drilled to 11,716 feet, 5½-inch casing was set at 11,711 feet with perforations made at 11,536-538 feet. On first gauge, through the drill stem, the well flowed at the rate of 178 barrels of oil daily through ¼- and ⅛-inch chokes with tubing pressure of 1800 pounds.

The company's Manhattan Land & Fruit Company 2-C, offset to the Manhattan C-1, deepest producer in the field, is drilling in shale at 11,843 feet, at about the depth of the C-1.

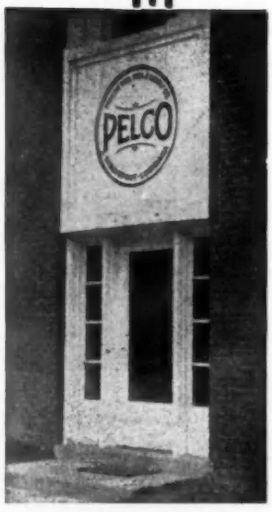
Jefferson Davis Parish: Sohio Petroleum Company is opening new production in the Iowa Junction area at Claudius Fontenot et al 1 in 15-10s-6w. Perforated at 9694-9703 feet, the well came in flowing at the rate of 6 barrels of 37-gravity oil an hour through a ⅛-inch choke with a tubing pressure of 1350 pounds. Gas-oil ratio was 600/1. Five and one-half inch liner was cemented at 9750 feet. Operator is still testing.

Jefferson Parish: The Texas Company's State-Barataria Bay 1, East Barataria Bay, is still conducting production tests below 11,000 feet. This wildcat was drilled to 14,490 feet with 5½-inch casing set at 12,164 feet. Tests at 12,086-108 feet and 11,712-732 feet showed salt water and gas. A squeeze job now is being made on perforations at 11,423-428 feet.

Tangipahoa Parish: Amerada Petroleum Corporation's Lake Superior Piling Company 1, Wilcox sand wildcat in 11-4s-9e, has been abandoned at 9821 feet.

Here's to CHRISTMAS!

Santa is now quite an established institution, having the frosts of one thousand nine hundred and forty-five winters in his venerable beard. And while we've always served customers cheerfully in any emergency, we wouldn't relish the old boy's job this Christmas eve. Well, here's a thought: Men who TRY PELCO FIRST—the many men who work with equipment we vend—have about all the assurance possible against field trouble at Christmas. Or any other day.



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Franklin Parish Wildcat Becomes Oil Producer

Franklin Parish wildcat makes oil producer; Bossier Parish wildcat tests oil show in Nacatoch; Caddo wildcat tests show of oil in Travis Peak; deep tests drilling in Lake St. John field.

Franklin Parish: Gus Primos and C. W. Sharp's Butler 1, C SW NW 20-16n-8e, is a new wildcat oil producer about 3 miles south of Big Creek. The test is reported flowing 10 barrels of oil per hour, through perforations from 3525-40 feet in the Paluxy sand. Originally the well flowed oil and salt water, but those perforations were squeezed. Total depth is 3787 feet.

Atlas Oil & Refining Company's Baker 1, C SE SE 27-16n-9e, Lamar area, tested 15 million cubic feet of gas from the Tuscaloosa sand which was perforated from 4877-87 feet. These perforations were squeezed and crews are preparing to reperforate opposite the Massive sand from 4900-05 feet for a third test.

C. L. Smith's wildcat, Mitchell Estate 1, 28-11n-7e, is drilling below 7000 feet with no showings but is 100 feet higher on structure than was considered likely for the area. The well is scheduled to test the Tuscaloosa and is southwest of Hollygrove. Smith's Stark 1, C SE SW 26-13s-7e, is drilling below 5950 feet. Gas rock was reported absent or undeveloped.

Bossier Parish: Charles Lowery and Del Cryer's shallow wildcat Tokio test, Levy 1, 7-19n-11w, 4 miles west of Bellevue production, is reported to have tested a good oil show from the Nacatoch from 655-85 feet. A well abandoned several years ago produced 6000 barrels of oil from this area before going dry. Another well in the area tested shows of oil but was abandoned.

Caddo Parish: J. R. Querbes, Trustee, et al's A. J. Mitchell Estate 1, C NW NW 8-18n-16w, Longwood area, perforated with 32 shots to test the Moneyham sector of the Travis Peak sand and recorded a flow of oil and then a flow of gas and distillate. Two Travis Peak horizons have tested gas and distillate previously. Crews will squeeze and reperforate for a production test.

Concordia Parish: The California Company is perforating to test Paluxy sands in Pan-American Life Insurance Company 2, 5-9n-10e, a 10,356-foot test in the Lake St. John field.

Another California deep test in the Lake St. John field, Applegate 7, 14-9n-10e, squeezed split casing from 9702-10 feet and is now drilling at 9943 feet. Deepest set of perforations was from 10,830-53 feet, the only recovery from which was drilling mud.

Sabine Parish: The Carter Oil Company's Pickering Lumber Company 1, 14-4n-11w, wildcat, is drilling below 8293 feet in shale.

De Soto Parish: Spartan Drilling Company's wildcat, Thigpen 1, C NE NW 29-12n-11w, is below 8704 feet.

Ouachita Parish: The California Company's Walter Maxey 1, 32-18n-1e, is drilling below 9350 feet. The well is reported to have had a show of oil in the Sugar Creek sand of the Rodessa.

PEACE
At this season of the year, we pause to utter a prayer of gratitude that a global conflict has ended, and that this Christmas finds us a nation at peace. The Christmas Star, shining eternally, once again finds "Peace on Earth, Good-will toward Men," a reality.
We are thankful that those God-given natural resources, oil and gas, have again been turned to constructive service to mankind.
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☆ Arkansas

Two Wildcats Are Failures; Union Project Tests Water

Two wildcat, 1 field failures noted; Union County wildcat testing salt water in Smackover.

Union County: H. L. Hunt and The Atlantic Refining Company's Goode 1, NW 6-17s-13w, Champagnolle area, tested salt water from the Smackover. The well was drilled to 5667 feet with 5½-inch casing set at 5632 feet and a plastic plug at 5648 feet. Crews are preparing to perforate and test the upper Smackover, topped at 5618 feet. During a 20-minute drill-stem test of perforations from 5640-50 feet, crews recovered 720 feet of oil and 90 feet of salt water.

Ouachita County: J. Carnes Reynolds & Sifford 1, SE NW 8-14s-16w, was written off as another wildcat failure for the county, being abandoned at 3051 feet.

Lafayette County: Lyons & Prentiss abandoned Dees-Shea 1, C SW 25-17s-24w, the fourth failure for the McKamie area. The well went to 9345 feet, topped Smackover at 9265 feet, recorded porosity at 9318 and 9328 feet, but was bottomed in salt water.

Logan County: Arkansas Oklahoma Gas Company is drilling below 1886 feet in N. C. Biggs 1, S NE NW 7-7n-27w.

M. J. Reinhart's B. Nagle 1, C NE NE 11-8n-24w, is drilling at 3606 feet.

Miller County: G. Anthony et al's A. W. Smith 1, 24-15s-26w, wildcat, was also a failure at 4035 feet. The well had slight shows of oil but tested only salt water.

Columbia County: McAlester Fuel Company's Wesson A-1, C NW NW SE 24-15s-19w, which has indicated production in the Wesson area, perforated opposite 2619-29, 2681-86, 2693-97, 2740-46 feet and is testing. James was topped at 2975 feet. Total depth is 4200 feet.

Work Begins on Five-Mile Crude Line in West Texas

Construction is under way on a five-mile, four-inch crude line being built by Ralph Lowe, Midland, Tex., producer, from the Welch field, Dawson County sector of West Texas, to connect with The Texas-New Mexico Pipe Line Company's Slaughter field-Midland trunk line.

☆ Mississippi

Marion County Test May Extend Baxterville Field

Marion County test may extend Baxterville field; Jasper County prospect pumps 550 barrels on initial production test; Humble preparing for another flank test of Byrd Dome, Greene County; Madison County test swabs oil with considerable salt water.

Marion County: The Superior Oil Company's R. Batson 5, NEc SW SE 12-1n-17w, outpost prospect of the Baxterville field, Lamar County, appears to be headed for a successful completion to extend the limits of the field approximately a mile west across the county line. Casing was perforated with 36 shots at 7740-50 feet in the upper Tuscaloosa section and yielded an estimated 5 million cubic feet of gas per day. On a subsequent test of the lower reaches of the Tuscaloosa, casing was perforated in several sections at 8613-8764 feet and the well flowed at the rate of 260 barrels of 18.4-gravity oil per day through ¼-inch tubing choke. In the same county Humble Oil & Refining Company is building roads for W. E. Walker, SW SE 25-2n-18w, wildcat which will drive for the lower Tuscaloosa and Massive sand sections.

Jasper County: Lyons & Prentiss' Culpepper 1, NEc NW SE 13-1n-12e, East Heidelberg field, pumped 550 barrels of 21-gravity oil on initial production test. The Culpepper Unit 1, in the same section, is installing pump after a successful swab job in the lower Eutaw horizon at 5009-38 feet. Tide Water Associated Oil Company-Gulf Refining Company's Simmons-Morrison Unit 1, NEc NW SW 30-1n-13e, East Heidelberg, is installing pump after a 4-hour drill-stem test recovered 2600 feet of oil and 90 feet of mud from the Eutaw section at 4937-56 feet. In the West Heidelberg field Gulf's T. A. Myers Unit A 1, SWc 6-10n-10w, recovered an estimated 75 barrels of oil per day on successful swabbing operation. Pump is being installed.

Greene County: Humble's Harry Stover 3, NEc 20-3n-7w, is preparing for another flank test of the Byrd Dome hard on the heels of the recent abandonment of Harry Stover 2. Stover 2 was originally abandoned last spring after the driller tapped salt. This fall drilling was resumed and the hole whipstocked. Humble's Oscar E. Waer 1, NEc SE 33-5n-8w, wildcat which had encouraging shows further up the hole at 6749-64 feet, is running core tests in the 8000-foot zone. No shows have been noted in the lower horizons.

Copiah County: The Carter Oil Company's Reynolds C-133, NWc 12-10n-5e, wildcat, is drilling below 7138 feet with no shows.

Lincoln County: Sun Oil Company's Case Heirs 1, SW SE 8-7n-7e, in the 2-well Brookhaven field, is drilling below 8850 feet in chalk with no shows. Roeser & Pendleton's Nora Smith 1, NW SE 8-7n-7e, same area, is approaching 10,000 feet with no shows.

Perry County: Stanolind Oil & Gas Company's Masonite Corp. 1, SW NE 7-3n-9w, wildcat, is drilling below 7100 feet with nothing reported. The Wilcox section, which was topped at 2328 feet, was extensively cored with no shows indicated. Gulf's B. M. Steven 1, SE NW 28-5n-10w, is working below 8354 feet in black shale and testing. No shows have been reported so far.

Madison County: Jones' J. R. Anderson 1, NE SE 2-8n-1w, Flora field is preparing to install pump after well swabbed oil with a considerable amount of salt water in a test of the Gas Rock section below 4335 feet. Tests will continue in an effort to eliminate salt water production. Carter is preparing to spud Griffin 1 C-138, wildcat, in NEc NE NW 25-11n-3e.

Jeff Davis County: Gulf's Vinnie Walker 1, NWc NE SW 34-9n-19w, outpost attempt in the Gwinville field, is drilling below 3800 feet in a drive for the lower Tuscaloosa zone. Humble's Denkmann Lumber Company B-1, C SE SE 27-9n-19w, same field, is attempting to squeeze out salt water after tests of the Tuscaloosa horizon at 8451-54 feet recovered oil with heavy quantities of salt water. Gulf is erecting derrick for M. W. Berry 1, NWc SE NW 13-9n-19w in Gwinville. Humble's Andrew Barnes 1, NEc SE 24-7n-18w, wildcat, remains shut down for repairs after driller cored salt strata at 3329-36 feet and 3336-41 feet.

Smith County: Hunt Oil Company's Smith County Oil Company 3, SWc 4-2n-8e, has been abandoned in the Comanchean horizon at 7647 feet. The Wilcox, Eutaw and Tuscaloosa zones were extensively tested with nothing encouraging.

☆ Alabama

Danciger's Mobile Project Again Drilling After Test

Danciger Oil & Refining Company's William R. Giesler 1, wildcat in NE SW 8-4s-2w, Mobile County, is drilling below 7828 feet after core tests above that point revealed nothing encouraging.

Walker County: Glen D. Rose Oil & Gas Company's First National Bank of Birmingham 2, NW SE 30-12s-7w, is drilling below 1735 feet after a fishing operation at 1635 feet.

H. H. Deason's Debardeleban 1, SE NW 6-14s-5w, remains shut down waiting on orders after reaching total depth of 1225 feet.

Clarke County: C. V. Carey & Nu-Enamel Corporation have staked a wildcat, A. W. Hill 1, C SW NW NW 27-9n-1e, and are preparing to move in rig.

Georgia

Promise of increased activity for the new year in Georgia is indicated by the fact that 2 wells have rigged up and should spud shortly. In Crisp County, Kerlyn Oil Company's Cecil Pate 1, in Land Lot 144, Land District 13, will be drilled by Bullington and Holloway, while James E. Weatherford is making ready for H. Wilkes 1, about ½ mile south of Higginston in Montgomery County.

Florida

Humble Oil & Refining Company's Lownes-Treadwell 1-A, C SW NE 17-42s-23e, Charlotte County, is drilling below 13,330 feet with no shows reported.

Highlands County: Humble's G. C. Carleton Estate 1, C SW NE 34-38s-29e, deep test, is drilling below 12,744 feet in lime after running electrical log to that depth. No shows have been reported.

Collier County: Humble's Sunniland field test, Gulf Coast Realties 6, C SW NE 19-48s-30e, is drilling below 5060 feet in lime without showings.

Monroe County: Gulf Refining Company's State 1, SWc 2-67s-29e, wildcat, is drilling below 2999 feet in lime with no shows reported so far.

O. D. Robinson's State 1, NEc NW 29-59s-40e, has reached a total depth of 7540 feet but it experiencing considerable trouble with circulation.

Bay County: The Pure Oil Company's International Paper Company 4, wildcat in 8-3s-12w, is drilling below 860 feet.

Lafayette County: Sun Oil Company's Crapps 1, C SW NE 25-6s-12e, is fishing at 2512 feet.

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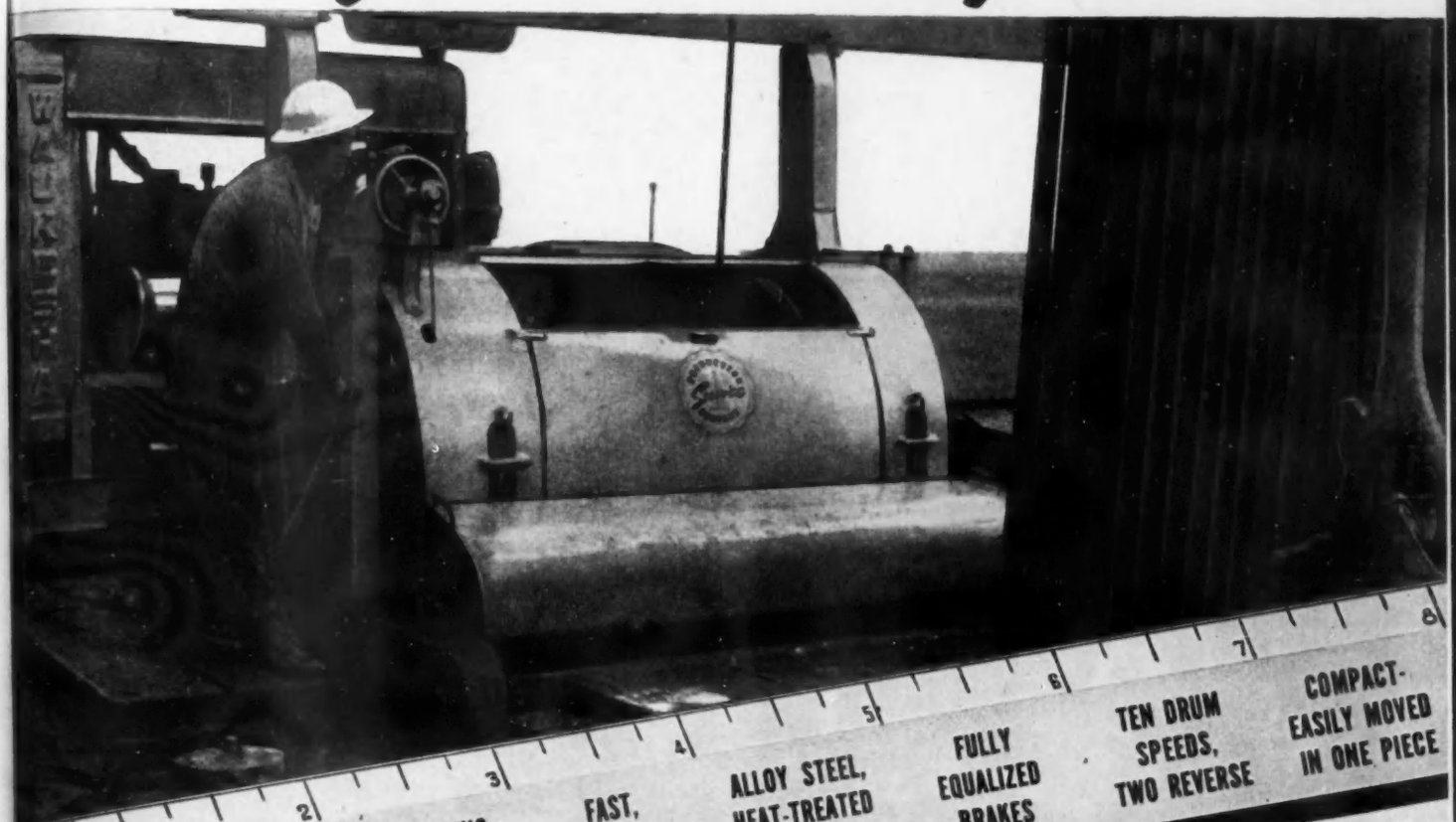

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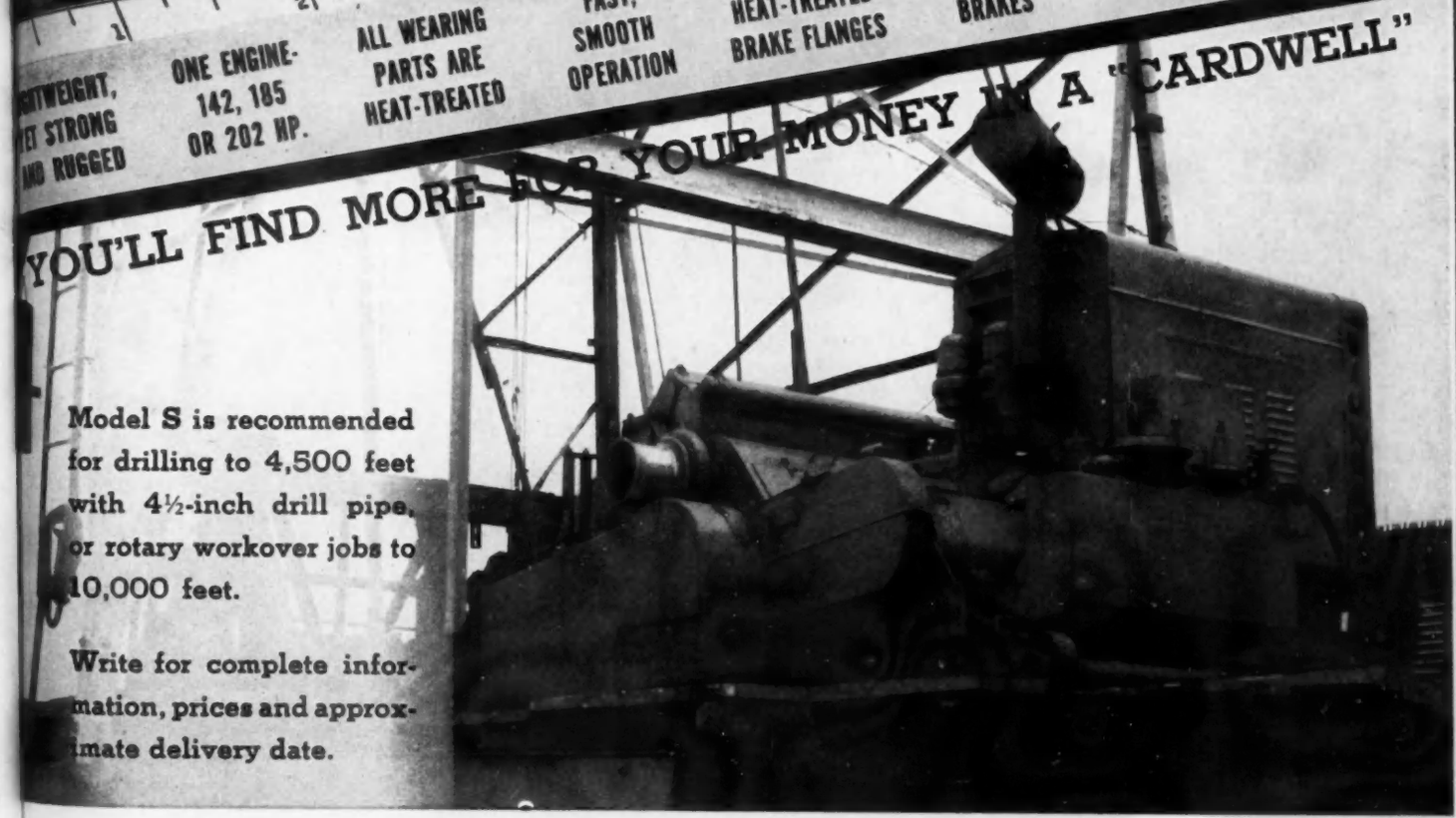

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☆ Michigan

Kent County Test Rated Traverse Lime Discovery

Byron MacCallum's Green 1, N½ SW NW 27-10n-12w, Tyrone Township, Kent County, 14 miles north of Walker field, is rated a discovery in Traverse lime at 2380 feet. It is flowing and pumping about 15 barrels of oil per day. Difficulties in getting an effective casing program has prevented steady production.

Crawford County: McClanahan Oil Company's Starr 1, NE NE SE 30-25n-1w, 5 miles north of Richfield (Detroit River) pool, showed 100,000 cubic feet of gas in the Richfield zone of Monroe at 4417 feet and some free oil. Operator plans to continue to about 5200 feet to test Sylvania section.

☆ California

Bandini Test Coring After Flowing 800-1000 Barrels

Richfield's Bandini wildcat is coring ahead after flowing 800 to 1000 barrels on test with water cut estimated as high as 30 percent; Shell is cleaning out Long Beach deep test and will continue to swab for production after recovering oil, mud and water; Union Pacific files notice of intention to drill 25 more wells at Wilmington; outpost in Grapevine-Tejon area, likely pumper, will extend field ½-mile; Paloma well flows 432 barrels on test.

Los Angeles County: Richfield Oil Corporation is continuing its efforts to eliminate water in Union Pacific Unit 1, probable discovery of a new oil field in the Bandini area a few miles east of Los Angeles. On recent tests the well, in 9-2s-12w, continued to flow at the rate of about 1000 barrels per day, with cut estimated to be about 30 percent. Latest report from the well credits it with a flow of 800 to 1000 barrels per day of oil with only an occasional slug of mud and water through a 5/8-inch choke. However, the well is being cleaned out to core ahead for a look below present bottom at 8608 feet. Company's Simons 1, about 1 mile east in Sect. 15, has reached 7000 feet and may be better located on structure. Company's third project in the area, Vail 1 in Sect. 16, about ½-mile east of the company's original project, is rigging rotary.

Shell's deep test of the Long Beach field, Alamitos 48A, deepest prospect hole in California with bottom at 14,950 feet, continues to swab for production. With 6⅝-inch casing cemented at 12,853 feet, 2164 feet of 4½-inch casing, including 352 feet of perforated on bottom, was landed at 14,947 feet. With two-inch tubing hung at 12,735 feet, with packer, well swabbed mud, water and oil. Perforations are being washed preparatory to further tests.

Union Pacific Railroad filed notice of intention with the State Division of Oil and Gas to drill 25 more wells in the Wilmington field. This brought the total number of notices to drill filed during the week to 51, the highest number since V-J Day. New well notices filed this year in California total 2037 as against 2142 to the same date last year.

General Petroleum Corporation's Buena Park wildcat, Librown 1 in 21-3s-11w, which flowed by heads on tests a fortnight ago, is being deepened. Crew is spot coring below 12,290 feet.

Standard Oil Company of California's Lewis-Community 1 in the Leffingwell area, 11-35-11w, which has also had fair showings, was coring at approximately 12,100 feet.

Wilshire Oil Company's Aliso Canyon field outpost, Marquis 1, 35-3n-16w, about ½-mile east of production, recovered only muddy salt water on a formation test with packer set at 8050 feet. Well is now coring below 8175 feet in shale and wet oil sand.

Kern County: British-American Oil Producing Company is preparing to put Tejon Ranch 41-5 in 5-10n-19w on the pump. Total depth is 2660 feet in oil sand, top of which was reached at 2622 feet. Final cut on swabbing was 36 percent mud, but no water. Successful completion of this well will extend the Grapevine-Tejon field ½-mile southeast. Chanslor-Canfield Midway Oil Company will drill Fee 48-32, 32-11n-19w, as a northerly offset to the British-American well.

In the Paloma field, The Superior Oil Company's Anderson 18-35 in 35-31s-26e flowed 432 barrels of 56-gravity oil in 21 hours on a formation test through a 14/64-inch choke. Tester has been pulled and the well will be deepened.

Tide Water Associated Oil Company's deep test of the Kern River field, Luck 154 in 30-20s-28e, was coring at 4692 feet in gray sand looking for the lower Vedder. Top of the main Vedder was logged at 4600 feet. Core recovery 4620-30 feet was 1½ feet of gray sand.

Belridge Oil Company's deep test of the South Belridge field is drilling at 5212 feet in Claystone.

Kings County: Standard's Kettleman Hills Middle Dome test, 73-30V in 30-23s-19e, with bottom at 9256 feet, was drilling after running a formation test which failed.

Santa Barbara County: General's first producer in the Santa Maria field, Defense 1 in 20-10n-34w, is showing an increasing rate of production. Well was brought in a week ago for 200 barrels of 16.5-gravity oil from the Knoxville Sandstone at 4910 feet. Present gauge is 239 barrels. Company is grading rig site for Tognazzini 1, a northerly offset.

Washington

Standard Oil Company of California's wildcat near Ferndale, Wash., has reached 1372 feet.

☆ Rocky Mountain Area

Another Prairie Wildcat Is Failure in Colorado

Another prairie wildcat fails in Colorado; Oregon Basin Cambrian test delayed.

Colorado

Activity in Rangely field, Rio Blanco County, continues to gain. Three new Texas Company locations were announced in a week and 2 for The California Company. Each completed a Rangely Weber during the week. California's S. W. McLaughlin Consolidated

Government 4 flowed 605 barrels daily through ¼-inch choke and Texas' U.P. 5 flowed 770 barrels daily.

Moffat County: On Hiawatha Dome, not far from the Wilson Creek and Rangely fields, Texas is moving in materials for Fred S. Duncan 1.

Bent County: The joint test of Frontier Refining Company and Pacific Western Oil Corporation, on Caddoa Creek, has been abandoned at 5943 feet.

Wyoming

While most of the Wyoming oil fields reported satisfactory routine completions during the week, the only new location anonunced was Continental Oil Company's Crary 37 in the Big Muddy field.

Interest continues to center at Oregon Basin, where the discovery of a thick, saturated sand in the Cambrian just above the granite has caused more excitement than any well in recent years. The discovery is credited to Val Kirk of Frannie, who retained ½ interest in any oil discoveries in the lower sands when he sold his Oregon Basin holdings to Pacific Western Oil Corporation. The discovery well was drilled to determine the value of the Kirk interest. Results of the discovery have been held up by a series of accidents in the hole. Bailer has been recovered, the pipe has been perforated with 15 holes at 6341-46 feet, and the drillers now are fishing for a lost gun.

Wyoming oil men say this well has demonstrated the presence of oil in rocks of Cambrian age and will result in drastic revision of many drilling programs during the coming year to test stratigraphically deeper formations than those now producing in the Rocky Mountain area.

☆ Canada

Shell Plans Deep Test on Jumping Pound Anticline

Shell Oil Company of Canada is starting another deep test on the Jumping Pound anticline, South Alberta Foothills structure 20 miles north of the Turner Valley field. The new test, Shell 16-14-J, is to be drilled in lsd 16 14-25-5w5, midway between the Shell 4-24-J, "wet gas" discovery which opened the structure in December, 1944, and the Shell 10-14-J, ¾ mile southwest of the discovery, which found water in the Madison lime objective last month.

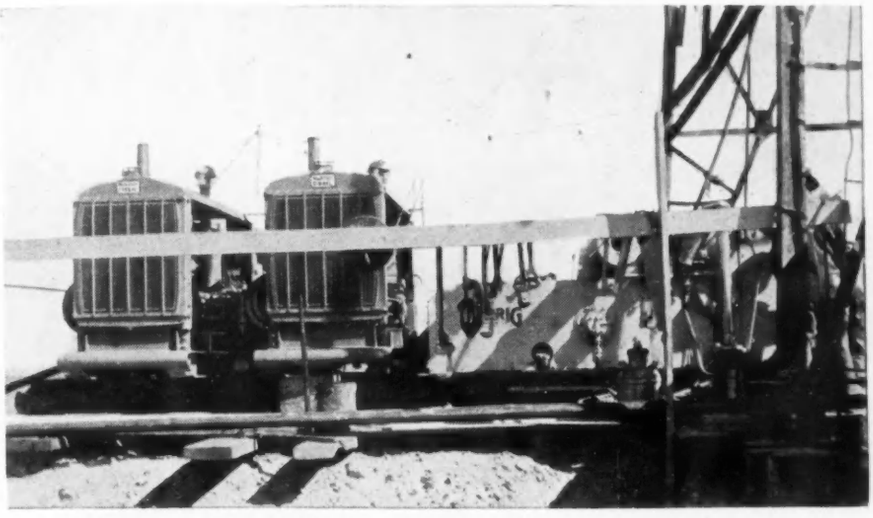
The No. 4-24-J reached the Madison at 9618 feet, 5598 feet subsea, and found 120 feet of porosity in the 329 feet of lime penetrated. It completed as a large "wet gas" producer, yielding under light back pressure 13½ million cubic feet of gas and 95 barrels of 46.5- to 54.6-gravity oil daily, with formation pressure 10-14-J found lime at 10,639 feet, 6616 in 24-hour build-up, 3910 pounds. The No. feet subsea or 1018 feet lower than the discovery. The Madison showed some gas plus considerable salty sulphur water.

The new venture—which will boost Shell's Jumping Pound investment to well over $1.5 millions—will try for the anticipated West Flank oil column in the narrowed but still promising structure. If successful, a possibly lengthy east flank in addition to the west, will be opened for development. With spudding early in January, Shell is expected to drill the new venture to completion with heavy duty steam rotary by mid-summer.

The Alberta Department of Lands & Mines reported that on November 30, a total of 59 reservations covering 4,812,923 acres of crown petroleum and natural gas rights were active in the Province. In addition to these, several million more acres of oil and gas rights owned by such large mineral and surface right holders as the Canadian Pacific Railway, Hudson Bay Company, and others, are held under lease or reservation by oil concerns, while large tracts of additional crown rights are held under lease.

Latest oil and gas rights acquisition from the crown covers about 400,000 acres in Southeastern Alberta, adjoining the Saskatchewan boundary, taken up by Standard Oil Company of California. In two reservations, Cal-Standard blocks include crown rights in Twps. 17 to 19 Rge. 1w4 and Twps. 16 to 19 Rges. 2 and 3w4; and in Twps. 20 to 22 Rges. 2 to 5w4. West boundary of the block is about 40 miles east of the Princess oil and gas area.

Imperial Oil Ltd., following up its natural gas exploration program on the Central Alberta Plains east of the Viking-Kinsella gas fields, has started imperial-Kinsella No. 4 in lsd 11 16-49-9w4. The site is 11 miles north and a mile east of the Imperial-Kinsella 1, Viking sand gas discovery completed early in December, and is 5 miles north of the Imperial-Kinsella 2, which has casing set at the Viking with gas indicated.



A pair of MURPHY DIESEL Model ME-66, 6 x 6½, 6-cylinder engines power this Model U-10 UNIT Rotary Drilling Rig, owned by Midwestern Drilling Company, Guyman, Oklahoma

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EXPLORATORY COMPLETIONS

ARKANSAS WILDCATS

Miller County—Failure: G. Anthony et al's A. W. Smith 1, e nwc se 24-15s-26w, Blossom 2215 ft, anhy 3757 ft, abnd 4035 ft.

Ouachita County—Failure: J. Carnes' Reynolds & Sifford 1, n swc se nw 8-14s-16w, abnd 3051 ft.

Union County — Failures: R. C. Wallingsford's Citizens Bank 1, c nw se nw 13-18s-13w, abnd 2578 ft.

R. C. Wallingsford's Duke 1, c sw ne nw 13-18s-13w, pump 8 bbls oil and pumped off, abnd 2328 ft.

CALIFORNIA WILDCATS

Kern County—Failures: Beverly Trading & Exploration Co.'s Orange Land Co. 1, 35-25s-27e, Jasmine area, Olcese 1394 ft, Pyramid Hills 2175 ft, Vedder 2267 ft, abnd gray sd 2279 ft.

General Pet. Corp.'s Calloway 66-17, 17-29s-27e, Fruitvale area, Rio Bravo 8606 ft, Vedder 8684 ft, abnd 10,052 ft.

Solano County—Failure: Standard of Calif.'s California Packing 4, 36-5n-2e, Rio Vista area, abnd 5100 ft.

COLORADO WILDCAT

Bent County — Failure: Frontier Ref. Co.-Pacific Western's Caddoa Creek 1, sw sw 21-26s-50w, abnd 5943 ft.

KANSAS WILDCATS

Greenwood County—Failure: R. P. Johnson's Johnson 1, c sw sw 18-26s-13e, Miss 1695 ft, abnd 1740 ft.

Stafford County—Failure: W. Hartman et al's Anschultz 1, se se nw 11-21s-14w, Lans 3365 ft, Vi 3604 ft, Simp sh 3635 ft, Arb 3694 ft, abnd 3750 ft.

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NORTH LOUISIANA WILDCATS

Madison Parish—Failure: Sohio's Anderson-Tully 1, 24-16n-13e, abnd 7200 ft.

Richland Parish — Failure: Am. Liberty's Mengel Co. 5, c se se se 19-17n-8e, no Tuscaloosa or Chalk present, abnd 3343 ft.

NORTH LOUISIANA OUTPOST

Bossier Parish — Benton Extension: G. H. Vaughn's Katie O. Padgett 1, c sw ne 1-20n-13w, elev 268 ft, Cotton Valley "D" sd 8007 ft, Bodcaw sd 8128-50 ft, perf 44 shots 8137-48 in Bodcaw, ran tbg with pkr between Bodcaw and "D," flow 117.24 bbls 42-gr, ½-in, gor 10,286/1; fr "D" flow est 28 mln gas open, rock pres 2730 lbs, gor 18,000/1, first oil prod in gas-distillate field, td 8200 ft.

SOUTH LOUISIANA WILDCAT

Tangipahoa Parish — Failure: Amerada's Lake Superior Piling Co. 1, 1980 e 660 n of swc 11-4s-9e, Het 4354 ft, Wilcox 6413 ft, abnd 9821 ft.

SOUTH LOUISIANA NEW PAY TEST

Assumption Parish—Napoleonville Discovery: Shell's C. L. Triche 1, 2194.4 n 60° 27 mins e 2316.8 s 89° 41 mins e fr swc 33-12s-13e, pay 9430-78 ft, perf 9462-67 ft 24 shots, flow 245 bbls 34.8-gr, 8/64-in, cp 1500 lbs, tp 1825 lbs, gor 890/1, td 9763 ft.

MICHIGAN WILDCATS

Clare County—Failure: Ashby Drlg. Co.'s Wiegert 1, sw ne se 25-18n-6w, abnd 1513 ft.

Kent County—Tyrone Oil Discovery: Byron MacCallum's Green 1, n½ sw nw 27-10n-12w, Traverse 2367 ft, flow & pump 15 bbls oil, 10 bbls water, td 2380 ft.

Lake County—Failure: H. Edd Bell's Kadwell 1, nw nw nw 29-18n-11w, Monroe 3545 ft, abnd 3633 ft.

Mecosta County—Failure: Chapman Oil Co.'s Minkel 1, s½ sw sw 7-14n-3w, Dundee 3586 ft, abnd 3746 ft.

Van Buren County—Failures: S. L. Godfrey's Koselink 1, nw nw ne 30-3s-15w, abnd 1016 ft.

C. W. Collin's Hughes 1, nw nw nw 21-4s-13w, Traverse 1145 ft, abnd 1168 ft.

MICHIGAN OUTPOST

Arenac County—Deep River Failure: J. E. Bauer's Dubiel 1, ne nw nw 30-19n-5e, Dundee 2787 ft, abnd 2985 ft.

OKLAHOMA WILDCATS

Cotton County—Failure: W. J. Hamilton's Kinnard 1, se nw se 23-5s-12w, abnd 1820 ft.

Garvin County—Failure: Tide Water's Prince 1, sw se sw 31-1n-2w, abnd 858 ft.

Grady County—Failure: Big Chief Drlg. Co.'s Bellar 1, se sw sw 11-6n-7w, abnd 7665 ft.

Hughes County—Oil Discovery: Wm. Bartlett et al's Howell 1, se sw sw 10-6n-8e, pump 45 bbls fr Booch sd 2616-32 ft, td 2632 ft.

Noble County — Failure: Renco Oil Co.'s Ryerson 1, nw ne nw 31-20-1w, Lay 3724 ft, Clev 4306 ft, Miss 4804 ft, Vi 4977 ft, 1st Wx 5069 ft, 2nd Wx 5163 ft, abnd 5190 ft.

Oklahoma County—Gas Discovery: Harper-Turner's Bailey 1, se nw 28-14n-2w, flow 1½ mln gas fr Btvs sd 5847-50 ft, td 5854 ft.

Pawnee County—Failure: J. R. Porter et al's Pawnee 1, ne ne ne 29-23n-4e, Btv 3435 ft, Miss 3505 ft, abnd 3983 ft.

WEST TEXAS WILDCATS

Andrews County—Failure: Sinclair Prairie's Bedford 1, c nw nw PSL 10, blk 73, elev 3223 ft, anhydrite 1540 ft, Yates 2890 ft, San Andres 4190 ft, Glorietta 5580 ft, base Permian 8260 ft, Mississippian 8705 ft, Devonian 9095 ft, Silurian 10,045 ft, Montoya 10,285 ft, Simpson 10,580 ft, Ellenburger 11,410 ft, abnd 11,528 ft.

Crockett County—Failure: Gulf's University 1-O, c ne ne sect 12, blk 29, elev 2719 ft, Ellenburger 8548 ft, abnd in sul w 8610-8665 ft.

WEST TEXAS NEW PAY TEST

Winkler County—Wheeler Silurian Discovery: Stanolind-Shell's Waddell Bros. 1, c se se PSL 8, blk B-7, ¾-mi nw extension, elev 3094 ft, Yates 2660 ft, base Permian 8010 ft, Mississippi 8120 ft, Devonian 8478 ft, Silurian 9170 ft, Montoya 9395 ft, McKee 10,095 ft, Waddell 10,390 ft, Ellenburger 10,740 ft, pump 141 bbls 31-gr oil, 25 bbls wtr, gor 1064/1, 9000 gals acid Silurian perf 9270-9390 ft, td 10,813 ft, pb 9452 ft.

WEST CENTRAL TEXAS WILDCAT

Callahan County—Failure: Premier Oil Ref. Co.-Octane Ref. Co.'s Horn 1, 990 snl 330 ewl of BBB&C Ry. 105, abnd 1717 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Failures: Gravis & Mitchell's S. Hinojosa 1, 330 fr s&wl A. M. Perez sur 71, abnd 6006 ft.

LOWER TEXAS COAST WILDCATS

Calhoun County — Failure: Salt Dome Oil Corp.'s State of Tex. 1-176, 838 fr el 890 fr sl 640-ac lse, San Antonio Bay State Tr. 176, abnd 6515 ft.

Jackson County — Failures: Wirt Franklin Pet. Corp.'s I. B. Clements 1, 3016 w of rd, 466 s of nl of 200-ac lse, 1000 s of Rose & Sample dry hole 1, 200-ac lse, T. P. Heard Lge, abnd 2800 ft.

A. H. & C. L. Rowan's L. Ranch 1, 330 fr m/nly/nl 990 fr m/ely/el of 160-ac tr, 330 w of swc I&GN sur, abnd 7010 ft.

Refugio County — Failure: Pan Oil Co.'s Ernest Haertig 1, 330 fr n&el w½ n&el se¼ sect 6, 80-ac lse, Johnson & Pugh sbdn, Bonnie View Rch, abnd 5510 ft.

UPPER TEXAS COAST WILDCATS

Brazoria County—Failure: Windsor Oil Co.'s Ernest L. Croix 1, 330 fr s&el 20-ac tr 18, ACH&B sur, sect 89, abnd 6151 ft.

Colorado County—Failure: Jack W. Frazier's McLane & Johnson 1, 467 fr s&el sect 40 and I&GN sur, 476-ac lse, abnd 6188 ft.

Ft. Bend County — Failure: Continental's G. M. Brunner 1, 990 fr e&sl 327.63-ac lse, Samuel Isaacs sur, abnd 8455 ft.

Montgomery County—Failure: Humble's E. L. Bender et al 2, 660 ne of swl Bender et al 5000-ac lse, Montgomery CSL sur 2, 4354 se of Bender 1 dry hole, abnd 7554 ft.

Wharton County — Failure: Wirt Franklin Pet. Corp.'s Minnie Howell 1, 467 fr s&el 160-ac lse, ETRR sur 75, elev 93 ft, abnd 7300 ft.

EAST TEXAS BORDER COUNTIES WILDCATS

Marion County—Gas Discovery: Stewart Co.'s Brown Est. 1, 100-ac tr, Jos. Watkins sur, 3½ mi ne Jefferson, L. Glenrose 6013 ft, Dees 6138 ft, Pettit 6592 ft, Travis Peak 6740 ft, ss dist & oil 6792-6826 ft, perf 48 shots 6198-6210 ft, flow 18,500,000 gas, rock press 2275 lbs, td 7200 ft, pb 6671 ft.

Panola County — Gas Discovery: W. H. Mitchell's Frost Lbr. Co. 1, C. F. Hull sur, perf 156 shots 5995-6020 ft, flow 82 mln gas, gor 66,500/1, rock press 2705 lbs, td 9030 ft.

NORTH TEXAS WILDCATS

Archer County—Failure: A. C. Parks et al's C. Benson-S. M. Cowan 1, 1200 out sec blk 10, Jefferson CSL sur, elev 1167 ft, Gunsight 1088-90 ft, abnd 1170 ft.

Baylor County—Failure: P. C. Burns et al's Syptak 1, nw nw se T&NO Ry. sect 213, A-367, abnd 2881 ft.

Cooke County—Failure: J. R. Meredith Dr. Co.'s Miller-Magnolia 1, 1500 nsl 330 ewl of 150-ac tr, G. W. Hawkins sur A-474, abnd top Variegated shale 2049 ft.

Jack County—Failure: Paul, Briscoe & Ferguson's Willis 1, 5950 nsl 2050 ewl of Geo. H. Duncan sur A-175, abnd 1800 ft.

Montague County—Failure: Nat. Assoc. Pet. Co.'s Alexander 1, 330 out nwc of 232-ac tr, A. Buffington sur, A-31, elev 962 ft, abnd 6413 ft.

Young County—Failure: A. C. Parks et al's Stowe 1, 2640 snl 1116 ewl sect 228, TE&L Co. sur, abnd 1029 ft.

NORTH TEXAS NEW PAY TESTS

Cooke County—Sivels Bend Discovery: Sun's Kate Allen 1, 467 nsl 400 wel of 77-ac tr, Sol Gann sur A-411, elev 838 ft, Rocky Point 5883 ft, Rasure sand 6726 ft, flow 253 bbls 36-gr, gor 200/1, natural via ⅜-in fr Strawn sd perf 6280-6300 ft, td 7450 ft, pb 6305 ft.

Young County—Unidentified Area Discovery: Republic Nat. Gas Co.-Fred M. Manning's M. K. Graham 1, 1450 snl 467 ewl of e 320 ac of sect 1, J. Poitevent sur A-227, ⅝ mi ne of depleted Bend prod, elev 1271 ft, flow 100 bbls 41-gr, gor 1500/1, natural via 15/64-in, Strawn sd 3075-90 ft, td.

WESTERN CANADA WILDCATS

South Alberta Plains — Millicent Failure: California-Standard Co.'s Millicent-CPR 1, lsd 13 17-20-13w4th, abnd Devonian dolomite 4266 ft.

Central Alberta Plains—Kinsella Gas Discovery: Imperial Oil Ltd.'s Imperial-Kinsella 1, lsd 11 20-47-9w4th, flow 7,805,000 gas fr Viking sand, td 2151 ft.

WILDCAT STARTS

CALIFORNIA

Kern County: Chanslor-Canfield Midway Oil Co.'s Fee 48-32, 32-11n-19w, Grapevine area, lcn.

L. A. Gilmour's Neff 1 and 2, 6-30s-29e, Edison area, dr.

Fred Goodstein, Operator, Hart 1, 25-25s-26e, Jasmine area, dr.

Independent Exploration Co.'s B. & J. 23, 24-30s-29e, Edison area, lcn.

Texas Co.'s Hintz 2, 23-30s-29e, Edison area, cellar.

COLORADO

Moffat County: Texas Co.'s Fred S. Duncan 1, se nw 20-12n-100w, Hiawatha Dome area, mim.

ILLINOIS

Christian County: John Wrather's Thompson 1, se se se 15-15n-2w, lcn.

Clark County: C. R. Craft's Madlem 1, sw sw sw 29-9n-14w, dr 311 ft.

Cumberland County: Nash Redwine et al's McKinney et al 1, ne sw nw 18-9n-8e, lcn.

Douglas County: James I. Darst's Thornley 1, se se se 3-16n-11w, dr.

Hamilton County: Nat'l Assoc. Pet. Co.'s Stephens 1, ne ne se 21-5s-7e, dr 112 ft.

Madison County: E. A. Oberling et al's Steiner 1, se nw se 14-4n-5w, lcn.

Marion County: Wm. L. Less et al's Mohler 1, sw sw se 4-1n-1e, dr.

Richland County: John Washburn's Levitt 1, s½ sw ne 22-3n-9e, lcn.

Shelby County: Gorman & Belden's Gerneng 1, sw sw nw 9-9n-5e, lcn.

St. Clair County: T. R. Kerwin et al's Scharf 1, nw se ne 4-1s-9w, dr 278 ft.

A. J. Walker's Marick-Thorp Cons. 1, nw ne sw 11-2n-6w, lcn.

KANSAS

Butler County: H & M Drlg. Co.'s Stern 1, se sw ne 22-27s-6e, lcn.

Ellis County: D. G. Gordon's Dreiling 1, sw sw se 21-14s-16w, lcn.

Marion County: Veeder Supply Co.'s Lietz 1, ne sw sw 6-18s-5e, dr 907 ft.

Morris County: Skelly's Stroda 1, ne ne se 5-16s-5e, lcn.

W. E. Harding's Kimd 1, sw sw ne 18-16s-5e, dr 250 ft.

Pratt County: Huber's Shanley 1, ne ne 30-27s-13w, mirt.

Russell County: Brunson Drlg. Co. et al's Dumler 1, se se ne 8-14s-13w, lcn.

Stafford County: W. L. Hartman et al's Hiss 1, ne ne sw 12-21s-14w, dr 1081 ft.

Woodson County: C. H. Barker's Colaw 2, sw nw ne 18-26s-15e, rust.

NORTH LOUISIANA

Bossier Parish: P. J. Aylward's Lodwick Lbr. Co. 1, 28-19n-11w, chalk test, lcn.

Franklin Parish: Albert J. McDonald's Walden 1, c sw sw 36-16n-9e, Tuscaloosa or Massive sd test, lcn.

Subine Parish: Union Prod. Co.'s La. Long Leaf Lbr. Co. 1, c sw sw 29-8n-11w, lcn.

SOUTH LOUISIANA

Iberia Parish: Continental's Willie S. Patout et al 1, go 2400 sw alg nwl sect 8 fr cor sects 8-9-34 th se at ra 330 to lcn in 8-13s-7e, 13,000-ft test, mim.

MICHIGAN

Osceola County: Ashby Drlg. Co.'s Sengelaub 1, nw se se 19-17n-10w, dr.

St. Clair County: Sterling O&G Producer's Toodzio 1, nw ne se 13-8n-16e, dr.

Tuscola County: Fred Riddell's Clark 1, ne se nw 33-10n-7e, dr.

Van Buren County: W. D. Gannett's Hood 1, nw sw se 28-3s-14w, lcn.

NEW MEXICO

Eddy County: Mac T. Anderson et al's Anderson-Federal 1, ne ne ne 35-19s-28e, 1800-ft Delaware test.

OKLAHOMA

Garfield County: J. E. Trigg's Johnson 1, ne ne ne 19-24n-5w, lcn.

Logan County: Globe O&R Co.'s State 1-E, sw sw se 16-17n-1e, lcn.

Harper-Turner et al's Freudenberger 1, sw se 9-17n-1w, woc 600 ft.

L. A. Johnston et al's Brickett 1, se se 26-19n-2w, mit.

Seminole County: Globe O&R Co.'s Horvell Est. 1, ne sw nw 20-7n-7e, lcn.

WEST CENTRAL TEXAS

Coleman County: Elgean Shield et al's Geo. M. Johnson 1, 2053 snl 330 wel of w 120 ac of sect 21, Phil Zoeller sur, 3000-ft cable test.

Jones County: Norman D. Fitz-Gerald et al's Hope Propst 1, ne ne sw T&NO Ry. 10, blk 1, lcn 3000-ft cable test.

H. L. Hunt's Leonard McCoy 1, 1600 ft nsl and 330 ft ewl of e½ sect 2, blk 16, T&P Ry. sur, ne Hodges, lcn 2700-ft test.

Stanley A. Thompson's Etta Whaley 1, nw sw sw sect 10, Orphans Asylum Lands, 5½ mi ne Anson, lcn 2500-ft rotary test.

Shackelford County: Phillips Pet. Co.'s Ace Hickman-Hudson (Ace-Pan) 1, 1665 wel 994 nsl ne¼ sect 16, Lunatic Asylum Lands, 1½ mi w of Sedwick, between shallow pools, lcn 4350-ft rotary test.

Roeser-Pendleton, Inc.'s T. W. Lee 1, c ne nw T&P Ry. 27, blk 11, 3 mi sw Albany, between shallow pools, lcn 5000-ft cable test.

Roeser-Pendleton, Inc.-Continental's Cook 1-A-35, 220 ft out nec sw sect 35, E.T. Ry. sur, lcn.

Stephens County: Fred M. Manning, Inc's C. J. O'Conner 1, c ne ne T&P Ry. 52, blk 7, lcn 4300-ft test.

SOUTH CENTRAL TEXAS

Bexar County: Walter H. Bode-Pegg Bros.' H. Lowe 1, 330 fr n&wl 31.2-ac lse, H. Virm sur 195, 1000-ft Navarro test.

Lee County: Humble's Geo. Vick et al 1, 660 fr nwl 600 sw of 300-ac tr, 2500 fr nel 3600 fr sel Bethel Smith sur, Tahglewood area, dr 6076 ft.

Medina County: H. W. Snowden's A. L. Haegelin 1, 330 fr s&el n½ W. E. Hanley sur 116, 5500-ft test.

SOUTHWEST TEXAS

McMullen County: J. W. Gorman's Reiz Bros. 1, 990 fr wl 330 fr nl AB&M sur sect 75, 4000-ft test.

Starr County: F. W. Dooley, Tr.'s L. Canales 1, 1200 fr swl midway nw&nel tr 5, La Sacatosa Gr, dr 600 ft.

Webb County: John F. Camp's Marrs McLean 2, 330 fr sl c e&wl blk 17, James sbdn Garcia Tr, Albercas Gr, 3000-ft test, ru.

LOWER TEXAS COAST

Jackson County: Monday Oil Co.'s Mary Hillman 1, 467 fr n&el Mary Hillman 400-ac tr in Jos. Rector sur, lcn.

Monday's Harry Sinter 1, 467 fr nwl 933 fr swl 200-ac lse, W. J. E. Heard sur, mim.

Jim Wells County: Bridwell Oil Co.'s Ramon Garcia 1-A, 330 s of nl 330 w of el 40-ac lse, La Trinidad Gr, 6000-ft test.

LaSalle County: Humble's St. Louis Union Tr. & Co. 1, 660 fr wl 1980 fr nl 640-ac GB&CNG sur 1429, 7700-ft test.

San Patricio County: J. K. Dorrance's Doris R. Bonorden 1, 330 nw of sel 330 ne of swl sect 3, 253.98-ac lse, Coleman-Fulton Pstr. Co., 7000-ft test.

Homer Easterwood et al's Leola M. Cage 1, 330 fr n&el lot 2 sect 10, 160-ac lse, 6500-ft test.

Fred M. Manning's J. E. Thompson 1, 330 sw of nel of blk 5 and 165.9-ac lse, Wm. R. Ray sur, ru.

UPPER TEXAS COAST

Chambers County: Humble's Lula Wallis et al 1, 660 fr s&el 200-ac tr and Samuel Mather sur, blk 13, tr 1, 6500 se Mayes prod, 10,000-ft test.

Glenn H. McCarthy's E. A. Wilborn et al 1, 694 fr nl 3555 fr wl 254.44-ac tr, Andrew Weaver Lge, Hankamer area, 10,500-ft test.

Newton County: Fred M. Manning-Yuega Corp.'s H. B. Funchess, Jr. 1, 3279.9 fr wl 660 fr nl 804-ac lse, ne¼ nw¼ Armond Davis sur, 7500-ft test.

Wharton County: J. B. Ferguson-J. F. Hutchins' Leo Brod 1, 800 fr nl 330 fr wl 93-ac tr, I&GN sur, nw¼ nw¼ ne¼ sect 33, elev 97 ft, 6500-ft test.

Humble's Tom Nichols 1, 560 w of el 660 n of wl sect 53, ETRR sur, W. El Campo area, spud.

Martin Thompson's O. B. Hamon 1, 660 fr n&el 80-ac tr, E. & H. Bolton sur, 5500-ft test.

EAST TEXAS BORDER COUNTIES

Harrison County: Midstates Oil Corp.'s J. M. Bryson 1, 1350 s of nl W. R. Anderson sur, 2 mi s of Waskom, lcn.

EAST TEXAS

Henderson County: Bobby Manziel et al's T. R. Chitty 1, 330 nsl midway of e&wl 30-ac tr, or 330 snl 4750 ewl Jose R. Morales sur, 3700-ft Woodbine test.

Smith County: Chapel Hill Gas System's Chas. Mayfield 1, 900 ewl 850 snl of 135-ac tr and Jesse Dunlap sur, 2½ mi s by e of Starville, lcn Paluxy test.

Van Zandt County: V. J. Meyer et al's A. W. Meredith 1, 330 fr se&nel of 40-ac tr, or 2600 fr sw 750 fr sel of R. C. Morris sur, 3 mi w Edgewood, mim for Travis Peak test.

TEXAS PANHANDLE

Hartley County: Stanolind's O. V. Beck 1, c nw nw sect 20, blk 15, Capitol Syndicate Lge 164, 6500-ft Ellenburger test.

WESTERN CANADA

Alberta Foothills Belt — Jumping Pound: Shell Oil of Canada's Shell 16-14-J, lsd 16 14-25-5w5th, rig.

Central Alberta Plains—Kinsella: Imperial Oil Ltd.'s Imperial-Kinsella 4, lsd 11 16-49-9w4th, rig.

Conservation Rules

The Oil and Gas Commission of Georgia, Waycross, Ga., has issued general rules and regulations governing the conservation of oil and gas, in Georgia. Copies can be secured by writing the Commission.

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SQUEAKS from the BULL WHEEL

This Curious World

The greatest mistake a man can make is to believe that a grass widow is green.

Whiskey may not cure a cold but nothing fails more agreeably.

A wise man seldom blows his knows.

Everything in the modern home is operated by switches — except children.

Many a man in love with a pretty face makes the error of marrying the whole girl.

There's a "Help Wanted" sign in the shoe store where the lisping salesman told the young lady: "I will twy and thee if I can find your thize."

Some girls are like the ocean—they look green but they can get awfully rough.

We know a girl who expects too much. She broke her engagement because, she said, her husband-to-be just simply can't bear children.

Title of the song the skunk sings when the wind changes: "It All Comes Back to Me Now."

Some people have driven as many as 30 cars without having a wreck, while others have driven as many as 30 wrecks without having a car.

Proof of the Praying

A preacher driving along the road came across one of his flock, cursing and sweating over a flat tire.

"Won't come off the wheel, eh?" said he sympathetically.

"Sure won't, Preacher, and I've been working and cussing here for an hour. I've tried everything."

"Have you tried prayer, my son?"

"You serious, Preacher?"

"Certainly, come, let us kneel and pray together."

Whereupon they knelt in the road and the preacher said a prayer. And sure enough, the tire tumbled off the wheel.

The preacher, still on his knees, eyed the wheel with astonishment. "Well, I'll be damned!" said he.

Poet's Nook

The eeriest sound in the world
Is a train whistle at night
But the weariest sound in the world
Is a husband saying "A-l-l ri-i-ight,"
In a long-drawn-out, disgusted tone
Which means he wants to be let alone.

The Subtle Way

"Wife, how did you get the baby to eat olives?"

"It was easy—I just started him on Martinis."

Natural Error

A drunk hastened to apologize for throwing his arms around a strange woman met in the street. "I thought you were m' wife."

"You're a fine husband for any woman to have, you sot!" she screamed.

"There, y'see," said he triumphantly, "you not only look like her, but talk like her!"

No Mind Reader

"My wife doesn't understand me. Does yours?"

"I dunno. Never heard her mention your name."

Follow the Leader

If there were 11 sheep in a field and six jumped over the fence, how many would be left?"

"None, teacher."

"Oh, yes there would. You don't know your arithmetic lesson."

"No, ma'am, but I do know sheep."

Historical Fact

"Are kings and queens always good, father?" asked the romantic daughter, looking up from her history book.

"They are not!" snorted her practical parent. "Nine times out of ten you'll find three trays out against them."

David C. Fransen, chief scout of the Corpus Christi division, has been appointed chief scout of Humble Oil & Refining Company, succeeding **John F. Bricker.** The change is effective January 1. Bricker, who succeeded the late **Dell Crosby** as chief scout several months ago, will go to Tyler as assistant division land man of the East Texas district.

Sgt. A. E. Beasley has returned to Shell Oil Company's scouting department after serving in the European Theater. He is headquartered at Monroe, Louisiana. **M/Sgt. R. R. O'Neil** has returned from duty in the Pacific to Shell's scouting department at Midland, Texas. **Lieut. Ben H. Bland** will return to Shell's West Texas scouting department in January. **Sgt. Bob Miller** has returned from service with the Marines to Shell's scouting department in the Houston office.

R. C. McKee has rejoined Standard oil Company (Indiana) as assistant advertising manager after 4½ years in the Navy, from which he was discharged with the rank of commander. McKee reported for active duty in May, 1941, and subsequently saw service with the staff commander of naval forces in European waters, was on the U.S.S. Yorktown in the Philippine campaign while attached to the deputy chief of naval operations, and was on special assignment with the office of the Secretary of the Navy in Washington.

He was executive officer of the training division which supervised photographic history of naval aviation in World War II and produced the motion picture, "The Fighting Lady."

Gilbert M. Wilson has returned to his post in Huntington Park, Calif., as district editor for THE OIL WEEKLY. Wilson, well known engineer-writer, recently was given his discharge from the Navy where as senior lieutenant he did valuable work on ships that put in on the Atlantic, Gulf and Pacific coasts. His last station was Seattle, Wash.

Garner C. Clark, geologist for Stanolind Oil & Gas Company, has been transferred from the Fort Worth division office to Midland as assistant district geologist for West Texas and New Mexico.

W. Guy Sinclair, veteran North Texas scout for Gulf Oil Corporation, has been promoted to zone agent for the North and West Central Texas district with headquarters at Wichita Falls, where he has served the company since March, 1919. He succeeds the late **C. W. Hanley.**

Dwight Tarpenning has resigned from J. E. O'Donnel of Enid, Okla., effective January 1, to become an independent operator with offices in the Knox Building, Enid. He was formerly associated with The Superior Oil Company of California at Oklahoma City.

Melvin D. Mauck, who won five campaign stars as a captain in the 12th Air Force, has rejoined The Pure Oil Company as a geologist in the enlarged Wichita Falls, Texas, district office. He was with the company at Fort Worth prior to entering the service in March, 1942.

M. T. Meadows, Buenos Aires, Argentina, who represents Engineering Laboratories, Inc., in that country, was in Tulsa, consulting with **W. G. Green,** president of the organization.

George A. Dye, veteran oil producer of Tulsa, and for 20 years vice president of the Wilcox Oil Company, has joined the staff of Freeborn Engineering Corporation, Tulsa firm engaged in petroleum engineering and oil production.

Cary P. Butcher, manager of West Texas and New Mexico operations of Richfield Oil Corporation for two years, has resigned to operate as a consulting geologist with office in the First National Bank Building, Midland, Texas.

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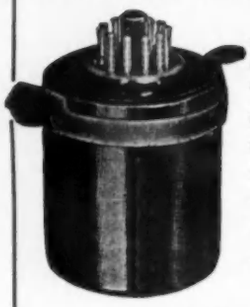

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MEN IN THE INDUSTRY NEWS

H. O. Harder has been appointed assistant general superintendent, production department, of Sunray Oil Corporation, with headquarters in Tulsa. He has been in the production division of the oil business for more than 20 years and has been active in the drilling and producing of wells in the Seminole and Oklahoma City fields.

C. V. Millikan, production engineer for Amerada Petroleum Corporation, Tulsa, has been appointed a member of the Oklahoma state board of registration for professional engineers.

Col. William S. Scully has returned from active duty with the Army to become associated with the law firm of Hill, Morgan & Farrer, with offices in the Title Guarantee Building, Los Angeles.

Prior to entering active duty with the Army in the Judge Advocate General's Department, he was general counsel for Independent Refiners' Association of Los Angeles. Immediately after his return in April from approximately three years' duty overseas and subsequent relief from active duty, he was appointed assistant chief counsel for PAW, Washington, D. C., serving in that capacity until the latter part of October.

E. B. Parmelee, Texas A. & M. College, spoke December 10 before the Houston Geological Society on "Midway-Wilcox Relationships in the Bauxite District of Arkansas."

Dr. L. W. Blau of Humble Oil & Refining Company has been named president of the San Jacinto Chapter at Houston of the Texas Society of Professional Engineers. **Wiley B. Noble** of Reed Roller Bit Company was chosen first vice president; **Harold J. McKenzie** of the Southern Pacific Railroad, second vice president, and **Ralph H. Peters,** Southwestern Bell Telephone Company, secretary-treasurer.

I. C. Smith has been appointed plant manager, and **Lee Fagg,** chief engineer, for American Well and Prospecting Company, a subsidiary of Bethlehem Steel Corporation, at the Corsicana, Texas, plant.

I. C. Smith

Smith succeeds **J. E. Rittersbacher,** who resigned November 30. Smith started work with Bethlehem Steel Company upon graduation from Lehigh University, and has been with the company since.

Fagg has been with American Well and Prospecting Company for a number of years, and prior to this connection was with National Supply Company.

Carl F. Schober and **Captain Kenneth F. Ames** have returned to the central sales division of Caterpillar Tractor Company. Schober will serve as district representative in the states of

Carl F. Schober

Kenneth F. Ames

Texas and New Mexico. He joined the company in 1941 as a member of the treasury department and was later assigned to the company's Washington, D. C., office to assist in various wartime activities.

Captain Ames returns as district representative in Montana, North Dakota, Saskatchewan and Alberta, after more than four years in the service. He joined the sales training division in 1936.

William E. Mikolasy has been appointed eastern sales representative of the Stacey Brothers Gas Construction, Cincinnati, one of the Dresser Industries. His headquarters will be at 122 East 42nd Street, New York. He formerly was connected with M. W. Kellogg Company, in New York, and was recently released from the Army Air Forces, with which he spent three years overseas.

Ernest A. Hanson has resigned as supervisor of oil and gas operations for the U. S. Geological Survey to do consulting work in the Rocky Mountain area. He formerly supervised oil and gas operations on public and Indian lands in the Southwestern Region with headquarters at Roswell, N. W., and more recently was in the same capacity for the Northwestern Region with main offices at Casper, Wyo.

Chester R. Rogers, West Texas district superintendent of natural gasoline plants for Lone Star Producing Company, has been transferred from Ranger to Tyler as East Texas superintendent of the company's gasoline and cycling plant. **J. A. Bates** succeeds Rogers at Ranger.

Dwight E. Shoemaker, scout for Humble Oil & Refining Company in the West Texas division, has been transferred from Midland to Abilene for similar duties in the West Central Texas district.

John F. Younger has been discharged after 4½ years in the service and has joined The Western Company Engineered Acidizing in the Permian Basin. He formerly was with Baroid Sales Division.

M. H. Arveson has been appointed senior technologist in the new chemical products department of Standard Oil Company (Indiana).

Frank Mace has been appointed sales engineer in Tulsa for the J. P. Bushnell Packing Supply Company of St. Louis, Missouri.

Deaths

Dana Hogan, a leading West Coast independent oil producer and civic leader, died December 14 in Los Angeles of a heart ailment. Hogan, 54, had been been seriously ill but two days. He was president of the Hogan Petroleum Company, which he founded in 1931. His operations were largely in the San Joaquin Valley and he was one of the organizers, and president at the time of his death, of the San Joaquin Valley Oil Producers Association. He was a director of the Western Oil and Gas Association and the American Petroleum Institute, and was a member of the Petroleum Industry War Council. After graduation from the University of Wisconsin in 1912 he went to California and became an employe of E. L. Doheny. Prior to forming his own company he was vice president in charge of producing operations of Doheny's Pan American Petroleum Company. He served overseas in naval aviation with the rank of lieutenant (junior grade) in World War I.

Holcomb B. Latting, Sr., attorney and tax counsel for Skelly Oil Company, died December 16 in Tulsa after an extended illness. Latting, 55, was born in Memphis, Tennessee, and moved to Purcell, Indian Territory, in 1897. He attended Chickasha high school, University of Oklahoma, George Washington University at Washington, D. C., and was a member of the first graduating class of the Law School of the University of Tulsa. He was a member of several scholastic societies and was a member of the Mid-Continent Oil and Gas Association, the National Tax Association, the Associated Industries of Kansas, the Associated Industries of Missouri and other industrial organizations.

Dwight, Troxell, 40, Eureka, Kans., oil man employed by The Ohio Oil Company, was killed December 10 by the discharge of a .22 caliber rifle which slipped from its rack at an oil rig.

Frederic A. Fleming, 52, Houston independent operator and veteran of both World Wars, was fatally injured December 17 in an automobile accident at Green Cove Springs, Florida.

John Jay McCrea, 38, production superintendent for Stanolind Oil and Gas Company, Tulsa, was killed in an automobile accident at Seminole, Okla., December 17.

William Samuel Fitzpatrick, former chairman of the board of Prairie Oil & Gas Company, died December 14 in his home near Brownsville, Texas. He had been retired for some years. Fitzpatrick entered the oil business in Independence, Kansas. Soon after the merger of the Sinclair Consolidated Oil Corporation and the old Prairie Oil & Gas Company, he was made vice chairman of the Sinclair Consolidated Oil Corporation and moved to New York. He received considerable attention in 1933 when he was called to testify before a U. S. Senate market investigating committee in connection with a reported "gift" of $300,000. It was reported the Rockefeller interests were responsible for obtaining the bonus for Fitzpatrick from Harry Sinclair but John D. Rockefeller, Jr., denied this before the committee. The bonus was a share of profits from 1928-29 operations in Sinclair Consolidated Oil Corporation stock.

Orville F. Macon, 57, a former independent oil operator of Tulsa, died December 16, in Muskogee, Okla. He was associated with Mid-Continent Petroleum Corporation. Macon lived for 35 years in Tulsa and had been associated with a number of oil companies.

William B. Sutton, 70, retired counsel for Magnolia Petroleum Company, died December 14, in Dallas. He had been retired since January 1, 1940. Sutton resided in Tulsa. In 1917-18 when he was connected with the land department of Prairie Oil and Gas Company, and again from 1923-26, when he served as assistant superintendent of the land department for Prairie. Later he became affiliated with Vacuum Oil Company and Magnolia.

Reed O'Neil, 44, special representative in Los Angeles for Reed Roller Bit Company of Houston, died following a heart attack at his home in Beverly Hills, Calif., December 12. O'Neil joined Reed in 1920 and had been with the company continuously since, for the last 20 years in the Los Angeles office. He had been a member of the Los Angeles Chapter of Nomads since its organization.

Clarence C. Wheeler, 58, employed for nearly 20 years in the gas measurement department of the Oklahoma Natural Gas Company at Tulsa, Oklahoma, died December 11, following a heart attack.

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Oil Measurement Tables

The Measurement and Sampling Sub-Committee of the Institute of Petroleum, London, England, has prepared a book, "Tables for Measurement of Oil," which has been compiled to meet the demands of the petroleum industry for authoritative tables for use in computing oil quantities in territories which employ the British (Imperial) system of weights and measures.

The work can, therefore, be regarded as the official British counterpart of the American publication, "National Standard Petroleum Oil Tables—Circular C 410," but is more extended in scope. In this new book the main tables contained in Circular C 410 have been recalculated to allow entry to be made with specific gravity instead of API gravity, and they have been supplemented with additional tables. These additional tables, giving weights per unit volume and volumes per unit weight, have been computed, using wherever possible basic data which is legally recognized, or which recent metrological research has shown to be most accurate. For these reasons the tables also will find wide application in the American oil industry.

Particular attention has been paid to ease of reference in compiling the book. The style of type and the format of the tables were also given careful consideration. Each table is preceded by its own introductory notes showing, among other things, why the table is necessary and giving examples of correct use.

Each of the 16 tables included in the publication will find a regular use in some branch of the petroleum industry. The price is $6 and the book can be secured from the Committee, in London.

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Automatic Control

"Principles of Industrial Process Control," published by John Wiley & Sons, New York, discusses the development and emergence of automatic processing control in its present status. The author is Donald P. Eckman, engineer of Brown Instrument Company, industrial division of Minneapolis-Honeywell Regulator Company.

The book is the first of its kind to be published concerning the overall basic fundamentals of the science of automatic industrial control. For the first time it puts between two covers all the technical and practical information about the new science which grew so rapidly during the war and which will play an even more important role in the years ahead, when efficient and economical production techniques will be counted upon to offset rising labor and raw material costs and high taxes. Automatic control, measurement and process are explained in language that is understandable to the student and worker and valuable as a guide and reference for the processor and his technicians.

Subjects covered include: Measuring means of industrial controllers, characteristics of measuring means, modes of automatic control, final control elements, process characteristics theory of automatic control, quality of automatic control, application of control engineering, automatic control systems, maintenance of exact control. The volume ends with a glossary of 126 terms and definitions. It also provides 119 references.

Under related headings the author has considered the various elements of error and lag, methods of regulation, cycling, pressures, humidity and air conditioning, maintenance and upwards of 150 other sub-basic principles.

Scouts' Yearbook

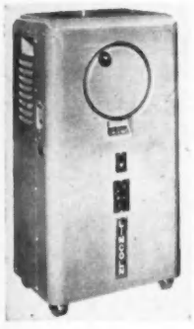
The 1945 Yearbook, a review of the oil and gas field development for 1944 in the United States, published by the National Oil Scouts & Landmen's Association, has been released for distribution.

The book presents the association's annual review of geological and geophysical prospecting, land and leasing activities, wildcat exploration, proven field development, oil and gas production, pipe line and refinery statistics.

The 1945 book was edited under direction of Howard R. Brooks, chief scout for the Magnolia Petroleum Company. E. J. Raisch was assistant editor.

1—Welder

A low-priced welder which is said to overcome objectionable features of previous welders designed for rural power lines has been announced by The Lincoln Electric Company, Cleveland.



The new unit, called the "Fleet-Arc Jr.," is for 230 volt, single phase power lines. It has a maximum input current of 35 amperes and provides a machine which meets new NEMA standards for this type of welder. It can be used with the standard 3-KVA power transformer provided by the power company. Current range is from 20 amperes at 20 volts to 180 amperes at 25 volts welding duty. It will handle electrodes ranging from 1/16 to 5/32-inch diameter.

The "Fleet-Arc Jr." which simplifies welding and multiplies its utility for repair and fabricating jobs, inaugurates a development known as the "Arc Booster" which provides quick, easy arc starting. The instant the electrode touches the work, the welding current is given a boost of intensity for starting the arc.

The current then reverts automatically to the amount set for the job. No high voltages or special high frequency devices are used, the output voltage being limited to a maximum of 52 volts.

Design and construction features of the new welder include:

Wear-free and vibrationless reactor current control with self-cleaning chain drive. No taps or plugs to develop loose connections.

Heavy copper winding with spun glass insulation and mica coil separators. Arc welded steel frame and housing.

"Fleet-Arc Jr." weights only 360 pounds and is, therefore, readily portable.

2—Cable Control

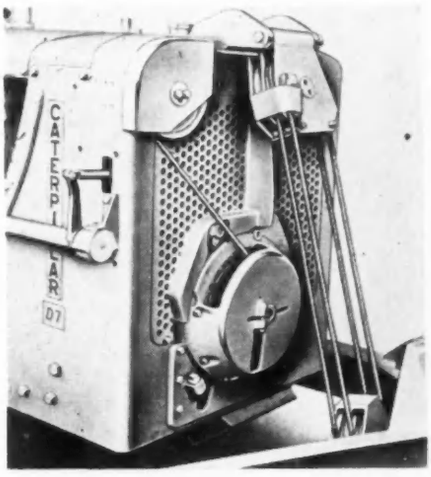
Caterpillar Tractor Company, Peoria, Ill., announces a single drum, front-mounted cable control with line pulls ample to meet the most severe service requirements imposed by bulldozer operation.

The drum is applicable to D8, D7 and D6 tractors. Foot per minute line speed, bare drum is 357 for the D8, 375 for the D7, and 525 for the D6. For full drum it is 527 for the D8, 552 for the D7 and 780 for the D6.

Drum diameters for all three models is nine inches, length 2½ inches, and drum flange diameter 14 inches. The cable size in ½-inch. Drum capacity is 75 feet and the clutch has 12 friction surfaces with an area of 564 square inches.

Clutch facing is metallic and the brake band diameter and width in each model is 15x2½ inches. Effective brake area is 111 square inches. Brake lining is molded and the approximate weight of each model, including adapter group, is 550 pounds.

Other features include positive action because the controls respond quickly to give accurate, powerful control with a minimum of operating effort. The design permits free spooling when desired. Brake release and cluth engagement or



clutch release and brake engagement are synchronized, and a large brake band assures ample power. The unit is readily accessible to the operator for adjustments, and the control lever is placed to insure a minimum of operator strain. Easily removable covers permit ready access for inspection or replacement of internal parts. The front cable control is of compact design, permitting close mounting to the tractor. Cast steel structural members and cast steel case provide structural strength. Anti-friction bearings are used throughout and the cable drum is set into a recess in the case to assure freedom from cable fouling.

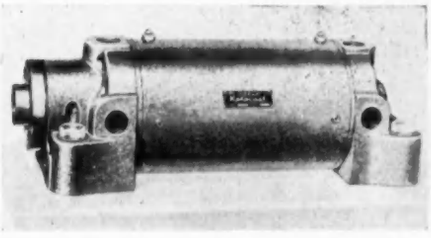
3—Hydraulic Cylinders

Logansport Machine Company, Logansport, Ind., has developed a line of "Rotocast" hydraulic cylinders, adaptable for a wide range of operations involving pushing, clamping, lifting, forcing, holding, pulling, pressing, and other power movements.

To fit the greatest number of applications the cylinders are offered in seven mounting types, three piston rod models and nine standard bores. They are available with cushioning at one or both ends if desired. Although primarily designed for oil service, the cylinders may be used for water service if the water is treated; if untreated water must be used, cylinders of special material can be supplied. The cylinders are built for operating pressures to 1500 pounds per square inch.

The cylinder barrels are centrifugally cast from close-grained iron. Piston rings are automotive type. The end covers are made of close-grained alloy cast iron and are attached directly to the barrel by heat-treated, socket-head cap screws, without tie rods. The end covers may be rotated on the barrel so as to place the vent ports at the top, bottom or either side. Alternate pipe tap locations, tapped and plugged, are also provided.

Cover attachment holes are standard on all models, making the covers of the various types completely interchangeable, and permitting a wide range of combination mountings such as flange mountings at rod end with foot mounting at blind end, etc. Standard mounting types include rabbeted, foot,



center-line, clevis, trunnion, flange at blind end, and flange at rod end.

Soft synthetic "O" rings are used to provide a permanently leak-proof seal between the cylinder barrel and end covers.

4—Amphibious Tractor

Food Machinery Corporation, Riverside, California, announces that the "Water Buffalo," or amphibious tractor so widely used during the war, will be adapted to peacetime activities. Stand-

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Clearing house for contraction and expansion in steam lines.

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UNIBOLT
(TRADE MARK REGISTERED U. S. PATENT OFFICE)
THE ONE BOLT COUPLING

ardization will probably result in not more than two peacetime commercial models.

According to inquiries received by the company, the oil industry visualizes wide use for a particular Buffalo in the discovery and development of oil in South America, Cuba, and along the Gulf Coast of Texas and Louisiana where transportation on both land, swamp and water is demanded of one vehicle.

A specialized amphibian is requested by one large oil group. It would be a large vehicle, mounting portable type production drilling rigs which would be capable of drilling 5000 to 6000 feet. This type would be completely unitized and carry a folding telescoping derrick as an integral part of the unit.

5—Greases

Dow Corning Corporation, Midland, Mich., announces two silicone greases for special high and low temperature applications, DC 33 and DC 44.

It is claimed that these greases are serviceable in ball bearings operating at speeds up to 10,000 revolutions per minute and are subject to bleeding of less than 2 percent after 16 hours at 110° C (230° F.). DC 33 is effective over a temperature range of minus 94° F. to 300° F. The other, DC 44 is serviceable at temperatures from minus 4° F. to 345° F. It is claimed that their low volatility and slight tendency to bleed recommend them for the sealed-in lubrication of ball bearings and for the lubrication of bearings operating at abnormally high and low temperatures.

6—Gasket

Goetz Gasket & Packing Company, New Brunswick, N. J., has developed a serrated type gasket known as Bellow-seal. The gasket consists of two discs of metal machined on their external faces with standard serrations and welded together around their outer periphery, combining the pressure and corrosion resistant qualities of metal gaskets with the light bolting requirements of a softer sealing medium. Line pressure entering the interior of the gasket exerts expansion pressure in excess of the required sealing force.

7—Arc-Welding Compound

Electric Welding Division of General Electric Company, Schenectady, N. Y., announces an arc-welding compound designed to aid in instantaneously creating and maintaining a metallic welding arc where low currents and small-diameter electrodes are employed.

The compound is in a paste form, and can be used on any kind of metal with any type of electrode.

8—Pipe Flange Opener

T. G. Persson Company, Bloomfield, N. J., has perfected a new tool, Flange-Jacks, for opening pipe flanges for gasket renewal. With the device flanges may be opened or closed without damage to flange faces, and without danger from sparks, chips, and flying wedges.

The tool can be used in tight, cramped locations. It is said to exert tremendous pressures, smoothly and evenly, eliminating vibration along the pipe line and the possibility of causing new leaks in nearby joints. The tool is capable of opening joints against a load of 15 tons, it is claimed, without damage to the flanges. As pressure is exerted the flanges open

evenly, without shock, and bolt holes are maintained in continuous alignment. Closures are accomplished in a similar manner.

In design the tool is simple. Jaws are of heavy, one-piece steel forgings. Screw points are case hardened. The standard size tool opens all two to 20-inch flanges and holds them in alignment.

Use the Coupon

For free copies of Manufacturers' Literature or more information on products described on these pages, use the convenient mailing coupon on page 93.

Literature

9—Motor

The Crocker-Wheeler Division of Joshua Hendy Iron Works, Ampere, N. J., has issued a four-page bulletin describing the Sealedpower motor. Included are a detailed description of the features of the motor and a cutaway view with pictures of six typical applications.

10—Conversion Factors

The I-T-E Circuit Breaker Company, Philadelphia, has published an eight-page folder, "Conversion Factors and Formulas for Electrical Engineers."

It contains over 600 conversion factors commonly used by electrical engineers as well as definitions of basic electrical units, prefixes, mensuration, and temperature conversion factors. The lists are arranged for use in a loose-leaf binder or for desk or wall mounting.

Worthington Executive Heads Diesel Engine Manufacturers

E. J. Schwanhausser, vice president of Worthington Pump & Machinery Corporation, was elected president of Diesel Engine Manufacturers Association.

Gordon Lefebvre, president of Cooper-Bessemer Corporation and J. E. Peterson, vice president of General Machinery Corporation, were elected vice presidents of the association.

Reelected as treasurer was Robert H. Morse, Jr., vice president and general manager of Fairbanks, Morse & Company.

Harvey T. Hill, executive director of Diesel Engine Manufacturers Association, was likewise reelected to serve through 1946.

New directors who were elected are A. W. McKinney, vice president of National Supply Company, and G. F. Twist, vice president and general manager of Atlas Imperial Diesel Engine Company.

Continuing on the board of directors are George W. Codrington, vice president of General Motors Corporation; Charles E. Brinley, chairman of the board, Baldwin Locomotive Works; Robert E. Friend, president of Nordberg Manufacturing Company; Norris H. Schwenk, president of Busch-Sulzer Bros. Diesel Engine Company; Schwanhausser, Morse and Lefebvre.

Among the topics discussed in the meeting were revision of the association's book of standard practices, the association's educational activities, legislation, termination and renegotiation of government contracts, price ceilings, surplus engines, railroad rates and tariff.

William J. Kelly, president of Machinery and Allied Products Institute, spoke at the association's luncheon.

New Factory Purchased by International Harvester

International Harvester Company, Industrial Power Division, Chicago, has announced purchase of a new factory to be known as "Melrose Park Works," from the Buick Division of General Motors. The new plant, together with Milwaukee Works and Tractor Works, will be used for the manufacture of all products of the Industrial Power Division. The new plant will be used primarily for the production of the current line of diesel engines, one current size of gasoline engine, two new larger diesel engines, one of which will be in the 100-horsepower range and the other in the 200-horsepower range, and a new large crawler tractor with about 130 drawbar horsepower and weighing approximately 36,000 pounds.

The engineering department of the Industrial Power Division will also be housed in the new plant.

Firm Name Changed

The corporation name of Kinner Motors, Inc., Glendale, California, was changed by stockholders' vote to Gladden Products Corporation. No change in executives or directors was made.

Geophoto Firm Formed

The Geophoto Services, Inc., has been organized at Denver, Colo., specializing in the application of photographic analyses for the oil industry. Organizers, all of whom served as officers in the U. S. Navy photographic intelligence service, include V. Zay Smith, formerly with British-American Oil Producing Company, president; Laurence Brundall, formerly with Shell Oil Company, and John C. Herman, graduate architect, vice presidents; Adam R. Wasem, formerly geology instructor at Louisiana State University, secretary-treasurer.

Lincoln Electric Founder Is Honored by Firm's Employes

John Cromwell Lincoln, founder of The Lincoln Electric Company, was recently presented a silver plaque by the firm's employes as a token of their esteem on the company's fiftieth anniversary. Lincoln started the concern with a capital of about $150, in Cleveland.

New Rockwell International Firm Opens New York Office

The Rockwell International Corporation has been organized, with offices in the Empire State Building, New York, to coordinate export activities of the subsidiaries and divisions of Rockwell Manufacturing Company.

Under the active direction of A. L. DiGuilian, the export organization will conduct sales for the Rockwell concern and will also handle export sales for several other independent companies.

Jones, Laughlin Opens Store

Jones & Laughlin Supply Company has opened a store at Crescent, Okla. Fred Bozeman, formerly at Russell, Kansas, has been transferred to Crescent as manager.

Merry Christmas

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STANDCO BRAKE LINING
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TRADING POST SECTION
ON PAGE 86 OF THIS ISSUE

Western Areas Charted by U. S. Geological Survey

Results of the study of the distribution, nature and thickness of formations of Upper Paleozoic and Mesozoic age in south-central Montana, conducted in cooperation with the Montana Bureau of Mines and Geology, were published December 3 by the U. S. Geological Survey in chart form.

Director William E. Wrather pointed out that the chart should prove useful as a guide to deep drilling to test the oil possibilities of the Carboniferous formations in the basin areas of that section, suggested by the fact that important oil-producing zones have been found in such rocks in Wyoming, northern Montana and Canada, and the Elk Basin field.

Titled "Columnar Sections of Mesozoic and Paleozoic rocks in the Mountains of South-Central Montana," it is Preliminary Chart 18 of the Oil and Gas Investigations series, and is available at 40 cents a copy from Washington, Billings, Montana; Tulsa, Denver, and Casper, Wyoming.

In another chart, the bureau reports the results of a recently completed study of oil-bearing and associated formations of northwestern Colorado and northeaster Utah. The investigation was begun when large new reserves of oil were being discovered in the Weber sandstone of Pennsylvanian age in the Rangely field of northwestern Colorado, and shows that the known producing zones and other zones that may contain oil or gas extend throughout the area and have suitable characteristics and thickness to encourage prospecting on many anticlines.

This is Preliminary Chart 16 of the Oil and Gas Investigation series, 75 cents, and available in Washington, Casper, Denver and Tulsa.

The bureau also issued a map showing the area and structural geology of the Little Buffalo Basin oil and gas field in Park and Hot Springs counties, Wyoming.

The map, available at 15 cents a copy from Washington, Denver, Casper, Wyoming, and Billings, Montana, depicts the real distribution of the upper Cretaceous Cody shale and the Mesaverde and Meeteetse formations exposed in the area, and the locations of all wells drilled before September 1, last.

September's Production Emphasizes End of War

Effect of the ending of the war was immediately reflected in the oil industry by a sharp drop in crude production in September the Bureau of Mines has reported.

September production was 4,413,000 barrels daily, a drop of 457,000 barrels from the August average, with Texas dropping 337,000 barrels, California 54,000 barrels, Illinois 16,000 barrels, and Wyoming 15,000 barrels.

Against a decline of 457,000 barrels in domestic output, daily average demand for domestic crude declined 691,500 barrels from the August level, to 4,233,100 barrels, the drop representing, in part, the effects of strikes and diminishing military requirements. As a result, for the first time in a considerable period, crude stocks increased, by 179,800 barrels a day, and totaled 225,079,000 barrels on September 30 against 219,956,000 barrels August 31.

The bureau reported crude runs to stills of 4,275,000 barrels daily in September, 653,000 barrels under the August level, and said that approximately half of the decline can be attributed to a reduction in peak military and export demands and the remainder to shutdowns resulting from strikes. Here the lessened activity resulted in a draft on products stocks, which dropped from 236,337,000 to 231,143,000 barrels during the month.

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